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Foundation for Science, Technology & Research
UNIVERSITY
(Estd u/s 3 of UGC Act of 1956)

Division of Mathematics

Department of Science and Humanities

Board of Studies-Mathematics

Minutes of Meeting

Date: June 5,2013.

The Board of studies met on 05.06.2013 at 10.30 a.m to discuss the proposed syllabus in mathematics to be implemented from the academic year 2013-14.The following members were present.

Members present

1. Dr.M.Srinivasulu, Professor & *HOD,S&H, Vignan University*	Chairman
2. Dr.Y.N.Reddy, *Professor,NIT Warangal*	Subject Expert
3. Dr.P.L.N.Varma, *Head Division of mathematics, Vignan University*	Member
4. Mr.U.V.manoj Kumar, *Asst. Professor, Vignan University*	Member

Changes have taken place in the mathematics courses for the first time separate mathematics courses such as Mathematics for Biotechnologists-I and Mathematics for Biotechnologists-II were introduced for the students with biology back ground during their plus 2 level.

a) Mathematics-I
b) Mathematics-II
c) Complex variables and Special Functions
d) Probability & Statistics
e) Mathematics for Biotechnologists-I
f) Mathematics for Biotechnologists-II

(Dr. Y. N. Reddy)

(Dr. P. L. N. Varma)

(Dr. M. Srinivasulu)

(Mr. U. V. Manoj Kumar)

VIGNAN UNIVERSITY

DEPARTMENT OF SCIENCE & HUMANITIES

Minutes of Board of Studies Meeting – Chemistry

The following members are present for the board of studies meeting held at 10.00 am on 18-05-2013 at Vignan University, Vadlamudi.

1. Dr. K. Laxma Reddy Prof in Department of Chemistry, NIT, Warngal.
2. Dr.V.Madhu Sudhana Rao,Professor in Chemical Engineering,Vignan University
3. Dr. M.Sreenivasulu, Prof and HOD, S&H (BOS, Chairman), Vignan University.
4. Dr. R. Venkat Nadh, Prof in chemistry, Vignan University. R.V. Nadh
5. Dr. N.Srinivasu, Prof in chemistry, Vignan University. N. Srinivasu
6. Ms. N.Satyasree, Asst. Prof in chemistry, Vignan University.
7. Ms. M..Sireesha, Asst. Prof in chemistry, Vignan University.
8. Mr. K.Maria Das, Asst. Prof in chemistry, Vignan University. K. Maria

The Decisions are:

- Dr.R.V.Nadh & Dr. N.Srinivasu are requested to prepare the syllabus with the help of other members.
- It is decided to propose Chemistry Theory and Lab with different components as per the requirements of Engineering branches.
- It is deiced to make minor modifications in Chmistry syllabus for I B.Tech and II B.Tech Chemical engineering
- According to the decisions made Chemistry syllabus was framed for I B.Tech all branches and Chemistry Lab for all branches except CSE, IT Department.

The following are the outcomes of the BOS meeting:

- It is decided to make required changes in the Chemistry syllabus for I B.Tech and II B.Tech Chemical engineering branches as per the requirements of current engineering and industry.
- According to the decisions made the following chemistry course syllabus are modified.
    - Engineering Chemistry (Theory & Lab) for I B.Tech (25% modified)
    - Organic Chemistry (Theory & Lab) for II B.Tech Chemical Engineering (20 % modified)
    - Physical & Analytical Chemistry (Theory & Lab) for II B.Tech Chemical Engineering (30% modified)
    - Instrumental Methods for Chemical Analysis for II B.Tech Chemical Engineering (20% modified)
- All the courses are modified in such a way that they are falling under the category of skill development/Employability. The modified chemistry courses are given below.

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ENGINEERING CHEMISTRY for I B.Tech

Sub Code: HS109

Credits : 04

OBJECTIVE OF THE SUBJECT:

Chemistry is the backbone in designing and understanding the nature and properties of various engineering materials. Currently, the electronics and computer engineers are waiting for suitable polymers for using miniature super computers. So this subject develops fundamental knowledge about new engineering materials and their significance in technical fields and industrial sectors. Water is an essential element for the existence of human, plant and animal lives, besides that it has greater industrial applications. The knowledge about water is the basic requirement for a professional student. Characterizations of materials, instrumental techniques are essential for engineers.

FOR All B.Tech Branches:

UNIT-I: WATER TECHNOLOGY: **[10 hrs]**

Introduction-Hardness of water-Determination of hardness by EDTA-Disadvantages of hard water-Scales & Sludges-Caustic embrittlement-Boiler corrosion-Priming & Foaming, WHO, BIS Standards of water-Softening Methods- Lime Soda process, Zeolite process, Ion Exange process - Desalination of brackish water-Reverse osmosis, Electro dialysis .

UNIT-II: ELECTRO CHEMICAL CELLS AND CORROSION: **[10 hrs]**

Electrochemical cells:-primary cell-(Dry or lecalanche cell), Secondary cell-(Lead-acid storage cell, Lithium ion battery), Hydrogen-Oxygen Fuel cell, Methanol fuel cell.

Corrosion: Introduction-Dry corrosion (chemical)-Wet corrosion (electrochemical)-Mechanism of wet corrosion-Bimetallic corrosion-Concentration cell corrosion-Factors influencing corrosion-Corrosion control method- Cathodic protection and Electroplating.

UNIT-III: ENGINEERING MATERIALS: **[10 hrs]**

Properties and engineering applications of Ceramics, Refractories, Glasses, Cement,Abrasives, Lubricants.

UNIT-IV: POLYMERS: **[10 hrs]**

Introduction –Types of polymerization-Preparation, properties & applications of, Polyethylene,PVC,Tefflon,Bakelite,UreaFormaldehyde,Silicones, Rubber – Vulcanization, Synthetic Rubbers-(Buna-S,Buna-N,Neoprene).Elementary treatment of Membranes

UNIT-V: INSTRUMENTAL TECHNIQUES: **[10 hrs]**

Interaction of radiation with matter.UV-Visible Spectroscopy-Beer –Lambert'slaw ,Qualitative and Quantitative Analysis,Block diagram of UV-Visible Spectrophotometer.IRSpectroscopy-Types of Vibrations,Identification of functional groups,Block diagram of IR Spectrophotometer

Textbooks:

1. P.C Jain and Monica Jain, "Engineering Chemistry", 15th edition, Dhanpat Rai Publications 2009.
2. Gurudeep Raj and Chatwal Anand, "Instrumental Methods of Analysis", 5th edition, Himalaya Publications, 2007.

Reference books:

1. S.S.Dara, "Text book of Engineering Chemistry" 1st edition, S. Chand Publications, 2009.
2. C.V. Agarwal, C.P. Murthy, A.Naidu, "Chemistry of Engineering materials", 9th edition, BSP Publications, 2008.
3. M.R. Senapati, "Advanced Engineering Chemistry" 2nd edition, Lakshmi Publications, 2006
4. H.W. Wilard and Demerit, "Instrumental methods of Analysis", 7th edition, CBS Publications, 1986.

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ENGINEERING CHEMISTRY LAB

Sub Code: HS112

Credits : 02

Objective: This lab is intended to make the students enlighten with the theoretical concepts of chemistry .Instrumental techniques are useful for characterization of materials for future engineers.

Students may have to take up any 10 experiments from the following experiments.

Volumetric Analysis:

1. Determination of total Alkalinity of water
2. Determination of Percentage purity of Washing soda
3. Determination of Fe(II) by Dichrometry
4. Determination of Percentage of available chlorine in Bleaching powder
5. Determination of chlorides by Argentometry
6. Determination of Total hardness of water

Preparations:

7. Preparation of Bakelite
8. Preparation Of Urea- Formaldehyde Resin

Instrumental methods of Analysis:

9. Determination of Viscosity of a Lubricating oil
10. Determination of Strength of acid by conductometry
11. Determination of Mn^{+7} by Colorimetry
12. Demonstration of UV-Visible Spectrophotometer with Ferrothiocyanate

REFERENCE BOOKS:

1. Vogel's Text book of qualitative Chemical Analysis J.Mendham, R.C Denney, J.D. Bares, M.Thomas & B. Siva Sankar, Pearson Publications – Volume I (2009).
2. Experiments in Applied Chemistry by Dr.Sunita Rattan. S.K. Kataria & Sons publications,2008

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II B.TECH CHEMICAL ENGINEERING

ORGANIC CHEMISTRY

Sub Code: HS207

Credits : 04

OBJECTIVES: The designing and preparation of most organic compounds and pharmaceuticals is based on the reaction mechanism involved in the reaction. This course is aimed at making the student familiar with reaction mechanism and stereo chemical aspects.

UNIT – I **[10 hrs]**

(a) Reaction intermediates: Bond fissions, carbanions, carbonium ions, Free radicals, Nitrenes, Carbenes, Nucleophiles and electrophiles

(b) Polar effects: Inductive effect, Resonance, Hyper conjugation, Electromeric effect

UNIT – II **[10 hrs]**

(a) Types of organic reactions: Electrophilic reactions: Friedal - Craft's reactions, Reimer - Tiemann reaction. Beckmann rearrangement. Nucleophilic reactions: Aldol condensation, Perkin reaction, Benzoin condensation.

(b) Free radical reactions: Halogenation of alkane, Addition of HBr to alkene in presence of peroxide.

(c) Allylic halogenation: NBS and thermal halogenation.

UNIT – III **[10 hrs]**

(a) Characteristic properties of Alcohols, Phenols, Carboxylic acids, Aldehydes, Ketones, Amines.

(b) Organic named reactions: Wolf – Kishner reduction, Hoffmann rearrangement, Sandmaeyer reaction. Diels – Alder reaction.

UNIT – IV [10 hrs]

a) Stereo chemistry: Stereo isomerism, Optical isomerism, Symmetry, Chirality, Lactic acid, Tartaric acid, Enantiomers, Diastereomers, R and S nomenclature, Racemic mixture and resolution methods.
b) Geometrical Isomerism, E and Z nomenclature
c) Conformational isomerism in cyclohexane.

UNIT – V [10 hrs]

Heterocyclic compounds: Nomenclature, preparation ,properties and uses of

1) Furan 2) Thiophene 3) Pyrrole 4) Pyridine 5) Quinoline 6) Iso – quinoline

TEXT BOOKS:

1. Arun Bahl and B.S. Bahl , "Text Book to Organic Chemistry", 18th edition, S. Chand, 2009.

REFERENCE BOOKS

1. I. L. Finar; "Organic Chemistry", Vol – I, 6th edition, Longman Scientific Publications, 2006.
2. Somendra Nadh Sanyal, "Named reactions, Rearrangements and Reagents", Bharathi Bhavan Publications, 2003.
3 O.P. Agarwal, "Reactions and reagents", 46th edition, Goel Publications, 2005.
4 R.T Morrison and R.M. Boyd, "Organic Chemistry" 6th edition, Pearson Publications, 2008.

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ORGANIC CHEMISTRY LAB

Sub Code: HS208

Credits : 02

I. Criteria of purity of solid and liquid compounds

a. Determination of Melting point
b. Determination of Boiling point

II. Detection of extra elements in organic compounds

c. Nitrogen
d. Sulphur
e. Halogens

III. Identification of an unknown substance from the following organic compounds

f. Acids
g. Alcohols
h. Aldehydes
i. Amides
j. Amines
k. Carbohydrates
l. Esters
m. Ketones
n. Nitro Group
o. Phenols

IV.Preparations

a Asprin

b m-dinitro benzene

Reference Book:

A.I Vogel, "Elementary practical Organic Chemistry", 2nd edition, Pearson Publications, 2000.

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II B.TECH CHEMICAL ENGINEERING

PHYSICAL AND ANALYTICAL CHEMISTRY

Sub Code: HS204

Credits : 04

OBJECTIVES: Chemical Engineering is mostly based on applications of concepts of Physical and Analytical Chemistry. This course will impart a sound understanding of concepts that are relevant to chemical engineering studies

UNIT-I : **[10 hrs]**

(a). **Distribution law** :Nernst Distribution law, Distribution coefficient – explanation and limitations of distribution law – modified distribution law – applications of distribution law, critical solution temperature and its determination for phenol water system.

(b). **Colligative properties**: Calculation of molecular weights by using colligative properties.

UNIT-II: **[10 hrs]**

Catalysis: Types of catalysis, characteristics of catalytic reactions, Theories of catalysis, Enzyme catalysis, characteristics of Enzyme catalysis.

Adsorption: Types of adsorption, adsorption Isotherm, Freundlisch Adsorption isotherm, Langmuir Adsorption isotherms, Adsorption of solutes from solutions, BET equation-its applications,applications of adsorption, Ion exchange adsorption, applications of ion exchange adsorption.

UNIT-III: **[10 hrs]**

(a). **Phase Rule:** Explanation of terms in phase rule, derivation of phase rule, one component systems, eg: water, sulphur systems, two component system eg: The silver lead system,

(b). **Chemical Kinetics:** Rate of reaction, order of reaction (1^{st}, 2nd, 3rd order of reaction), factors influencing rate of a reaction, molecularity.

UNIT – IV:

Treatment of analytical data: **[10 hrs]**

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II B.TECH CHEMICAL ENGINEERING

PHYSICAL & ANALYTICAL CHEMISTRY LAB

Sub Code: HS205

Credits : 02

PHYSICAL CHEMISTRY LAB

1. Determination of rate constant for 1st order reaction by hydrolysis of methyl acetate.
2. Determination of partition coefficient of iodine in between water and CCl_4.
3. Determination of partition coefficient of benzoic acid between water and benzene.
4. Determination of surface tension by stalagmometer.
5. Adsorption of solution on activated charcoal.
6. Determination of critical solution temperature for phenol water system.

ANALYTICAL CHEMISTRY LAB

1 Conductometric Titration - Mixture of acids
2 Potentiomtric titration- Estimation of iron (II)
3 P^{H} metric Titration –Strength of acid
4 Clorimertry-Simultaeneous determination of 2 components(Cr^{+6} &Mn^{+7})
5 Chromatography- Paper Chromatography / TLC
6 Ion exchange Method -Determination of concentration of a salt

TEXTBOOKS:

1 Vogel's Textbook of Quantitative Chemical analysis J. Mendham, R.C. Denney, J.D. Barnes, M.Thomas & B.Siva Sankar, "Pearson Publications"–Volume – 1, 6th edition, 2009.

2 B.Viswanathan, P.S.Raghavan, "Practical Physical Chemistry", 1st edition, Viva Books Pvt, 2005.

(a)Classification of Analytical Methods .Types of samples. Preparation of sample for analysis, procedure of sampling of solids, liquids and gases.

(b)Accuracy, precision and sensitivity, Measures of precision -Standard deviation, Quality control-standards of purity

UNIT – V: **[10 hrs]**

Chromatography

Theory and types of chromatography.

Paper chromatography – Principle, Migration parameters, Types of paper chromatography, Applications.

Thin layer chromatography – Principles, preparation of thin layers, Applications.

Gas Chromatography – Instrumentation, Detectors and Applications.

HPLC – Principles, Instrumentation, Pumps, Detectors, Applications.

TEXTBOOKS:

1. A. Bahl, B.S.Bahl and G.D. Tuli, "Essential of Physical chemistry", 1st edition, S Chand, 2009.
2. Gurudeep Raj and Chatwal Anand, "Instrumental Methods of Analysis", 5th edition, Himalaya Publications, 2007.

REFERENCE BOOKS:

1. S. Glasstone and Lewis, "Physical Chemistry", 2nd edition, Mac Million Publications, 1998.
2. P.W.Atkins, "Physical Chemistry", 8th edition, Oxford up Publications, 2007.
3. D.A. Skoog and P.M. West. "Fundamentals of Analytical Chemistry", 8th edition, Harcourt Publications, 2006.
4. H.W. Willard and Demerit, "Instrumental Methods of Analysis", 7th edition, CBS Publications, 1986.
5. B.R. Puri and Sharma, "Physical Chemistry", 1st edition, Shobanlan Nagin Chand & Co, 2006.

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II B.TECH CHEMICAL ENGINEERING

II Year B.Tech. Chemical I – Semester

Credits: 4

(HS206) INSTRUMENTAL METHODS OF ANALYSIS

Objective of the Course :

Quality control, Assay of drugs, Analysis of samples from instrumental methods is an essential part of any pharmaceutical industry, Biochemical & chemical industries. This course will impart to students an understanding in these methods.

UNIT – I **(10 hrs)**

Molecular Spectrophotometry: UV – visible spectroscopy: Interaction of radiant energy with matter, Spectral Regions: Origin of spectra and electronic transitions, Absorbtion Spectra: Beer – Lambert's Law, deviations from law, Block diagram of UV – visible spectrophotometer – quantitative analysis – direct method for the determination of metal ions:analysis – Conjugated double bonds. Polyenes. Carbonyl compounds.Benzene and analytical uses of UV Spectroscopy.

UNIT – II **(10 hrs)**

Infrared Spectroscopy: Interaction of Infrared radiation with molecules.

Source of IR radiation, Spectral regions, Block diagram of IR spectrophotometer, function of each component, sample techniques, application of IR spectroscopy to functional group analysis.

UNIT – III **(10 hrs)**

NMR Spectroscopy: Magnetic properties of nuclei, theory of nuclear resonance, chemical shift and its measurement, importance, coupling constant, deshielding and shielding anisotropy, Interpretation of NMR spectra, Applications of NMR Spectroscopy, Instrumentation.

UNIT – IV **(10 hrs)**

Mass Spectroscopy: Introduction – determination of molecular weight and formulae, Mass spectrometer, Fragmentation of compounds, stability rearrangements, Metastable peaks, Applications of Mass Spectroscopy.

UNIT – V (10 hrs)

Electro Analytical Methods: Voltametry: Principle of micro electrolysis, polarization, DME, Polarograph, half wave potential, ilkovic equation.

TEXT BOOKS:

1. Gurudeep R.Chatwal, Sham K. Anand, "Instrumental Methods of Chemical Analysis", 1st ed., Himalaya Publishing House, 2007.

2. Willard, Merritt, Dean and Settle, "Instrumental Methods of Chemical Analysis", 1st ed., CBS Publishers and Distributors, 1986.

REFERENCE BOOKS:

1. R.A.Day and A.L.Underwood, "Quantitative Analysis", Prentice Hall Publications, 6th ed., 2009.

2. Jag Mohan, "Organic Spectroscopy", Principles and applications., 2nd ed., 2004.

3. B.K.Sharma, "Instrumental Methods of Chemical Analysis", Goel Publications, 1st ed., 2001.

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DEPARTMENT OF SCIENCE & HUMANITIES

The Board of Studies meeting, to review the I B.Tech syllabus of Engineering Physics and Engineering Physics Laboratory is held on **18-05-2013** at Vignan University, Vadlamudi.

1. Dr. A.R.C.Reddy, Professor of Physics, NIT, Warangal.
2. Dr. M.Sreenivasulu, (BoS Chairman), Professor, Head, Dept. of S&H, Vignan University.
3. Dr. K.V.Madhuri, Asso. Professor, Dept. of S&H, Vignan University.
4. Mr. J.N.Kiran, Asso. Prof, Dept. of S&H, Vignan University.

The following are the suggestions made:

1. The committee has discussed and formulated to proposed syllabus for Engineering Physics theory and laboratory.
2. Reviewed the topics of syllabus in detail, revised the earlier syllabus as relevant to an engineer.
3. In order to offer high degree, potential lab orientation considering basic science laboratories, Physics and Chemistry laboratories are being separated.
4. Incorporated, some new topics and titles in the previous syllabus so as to upgrade the syllabus to suit latest technological developments.
5. Basing on suggestion of subject expert, the committee felt it necessary to introduce a chapter on solar energy as it is going to be a futuristic major source of alternative energy.
6. Finalized the new format of the syllabus of Engineering Physics theory and laboratory.

ARCReddy
(Dr.A.R.C.Reddy)

(Dr.M.Sreenivasulu)

(Dr.K.V.Madhuri)

(Mr.J.N.Kiran)