No.44/2014 **NOTIFICATION** Date:24/4/2014

Subject : Syllabi along with other details for Certificate / Diploma course in 'Manufacturing of Electronic Kits' under the scheme of Career Oriented Programme at first degree level.

It is notified for general information of all concerned that the authorities of the University have accepted the syllabi of Certificate / Diploma course for the "Manufacturing of Electronic Kits" under the Scheme of Career Oriented Programme at first degree level as given in following Appendix-A, to be implemented from the Academic Session 2014-15.

It is further notified that the eligibility criteria and other details along with the Scheme of examination shall be as provided under Ordinance No.47 of 2005, Regulation No.38 of 2005.

Sd/-
(Dineshkumar Joshi)
Registrar
Sant Gadge Baba Amravati University

Appendix-A

SYLLABUS PRESCRIBED FOR CERTIFICATE COURSE IN "MANUFACTURING OF ELECTRONIC KITS"
Theory Paper
Manufacturing of Electronic Kits - I

Unit-I : **Introduction and applications of basic Hardware tools:**
Screw Drivers, Spanners, Strippers/Cutters, Pliers, Files, Hammers, Screws, Hand saw, Metal Cutters, Drilling machine, Drilling bits, Soldering Iron, Soldering bits/tips, Soldering metal, Soldering wax/paste, Desoldering pump .

Unit-II : **Identification and testing of Electronic components:**
Resistors, Capacitors, Inductors, Transformers, Diodes, Transistors, Switches, Relays, Fuses, Batteries (Different types of above components with proper symbol, ratings and testing methods).

Unit-III : **Soldering, Desoldering and Fabrication of PCB :**
Types of Wires/Cables, Pins, Sockets, Connectors; Lug board, Tag board, Bread board, Printed circuit board-PCB and its types; Soldering and desoldering of electronic components.

Unit-IV : **Applications of Electronic Instruments :**
Voltmeter, Currentmeter, Ohmmeter, Multimeter, Signal generator, Function generator, Cathode Ray Oscilloscope-CRO (Block diagrams & description of front panel controls).

Unit-V : **Construction & Troubleshooting of following Electronic Kits :**
Construction of Rectifiers, Filters, Unregulated & regulated power supply, Three terminal IC regulators (78XX & 79XX series), Dual power supply, KCL, KVL, Thevenins theorem, Nortans theorem, Maximum power transfer theorem.

Practicals :- Every student has to perform at least 10 experiments based on the theory paper.

Distribution of Practical Marks :

(1) One experiment from the list	-	30 Marks
(2) Viva-voce	-	10 Marks
(3) Practical Record	-	10 Marks
Total	-	**50 Marks**

Field Work / Project :-
Project work / field work involved design, assembly and testing of any basic educational electronic kit.

OR

Troubleshooting & critical analysis of atleast 2 different units/kits/gadgets of related subject/field should be submitted for certificate course.

Books :-

(1) Electronics Materials & Components : R D Supekar , Nirali Publication
(2) Modern Electronic Instrumentation and Measurement Techniques :.Helfrick & Cooper, Prentice Hall of India.
(3) Electrical and Electronic Instruments and Instrumentation : A. K. Sawhney (Dhanpat Rai & Sons)
(4) Principles of Electronic Instrumentation : A. I. Diefenderfer
(5) Basic Electronics by Malvino or Grob.
(6) Electrical Measurements by Goldy.
(7) Basic Electronics by B L Theraja

SYLLABUS PRESCRIBED FOR FOR DIPLOMA COURSE IN "MANUFACTURING OF ELECTRONIC KITS"

Theory Paper
Manufacturing of Electronic Kits - II

Unit -I : **Introduction and applications of advanced electronic tools/instruments :**
Digital Voltmeter-DVM, Digital Multimeter-DMM, Digital Frequency meter-DFM, Function generator(with digital display), Digital Thermometer, Digital Storage Oscilloscope-DSO, LCRQ meter, Digital Tachometer (Applications & Block diagrams only).

Unit -II : **Identification and testing of Opto-Electronic components/devices :**
LED, LDR, Thermister, Photodiode, Phototransister, Opto-coupler, Solar cell, LCD, Seven segment display, Fourteen segment display.

Unit -III : **Transistor Amplifiers and Oscillators :**
Transistor biasing, Single stage amplifier, Multi-stage amplifier, Differential amplifier; Hartley oscillator, Colpits oscillator, Wien bridge oscillator, Phase shift oscillator, Crystal oscillator, UJT as relaxation oscillator.

Unit -IV : **Introduction and applications of OP-AMP IC 741:**
Block diagram, Pin diagram, Inverting amplifier, Non-inverting amplifier, Buffer amplifier, Summing amplifier, OP-AMP as Subtractor, Integrator, Differentiator, Schmitt trigger.

Unit -V : **Introduction to Digital Electronics:**
Number systems, Logic gates, Boolean algebra, De-Morgan's theorem, Half adder, Full adder, Half subtractor, Full subtractor, IC 7483 as Binary adder.

Practicals :- Every student has to perform at least 10 experiments based on the theory paper.

Distribution of Practical Marks :

(1) One experiment from the list	-	30 Marks
(2) Viva-voce	-	10 Marks
(3) Practical Record	-	10 Marks
Total	-	50 Marks

Field Work / Project :-

Project work / field work involved design, assembly and testing of any analog/digital electronic kit.

OR

Troubleshooting & critical analysis of atleast 3 different units/kits/gadgets of related subject/field should be submitted for diploma course.

Books :-

(1) Modern Electronic Instrumentation and Measurement Techniques : Helfrick & Cooper, Prentice Hall of India.
(2) Basic Electronics by B L Theraja
(3) Electrical and Electronic Instruments and Instrumentation : A.K.Sawhney (Dhanpat Rai & Sons)
(4) Digital Computers by Malvino (McGraw Hill)
(5) Basic Electronics by Malvino.
(6) Electrical Measurements by Goldy.
(7) Operational Amplifiers by Ramakant Gaikwad
(8) Modern Digital Electronics by R.P.Jain.

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NOTIFICATION

No.45/2014 Date:24/4/2014

Subject : Cessation of membership on the Senate.

It is notified for general information of all concerned that the membership of Dr.R.S.Sapkal, Head, Department of Chemical Technology, Sant Gadge Baba Amravati University on the Senate under the provision of Section 25(2)(u) of the Maharashtra Universities Act, 1994 now stands ceased w.e.f. 1.4.2014 in accordance with the provision of Section 43 of the said Act, as he has been relieved from the Head of University Department.

By virtue of his membership on the Senate, membership acquired by him on any other authorities of the university shall also stand ceased.

Sd/-
(Dineshkumar Joshi)
Registrar
Sant Gadge Baba Amravati University

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NOTIFICATION

No.46/2014 Date:24/4/2014

Subject : Nominations of person/s on Standing Committee by the Academic Council/Senate

It is notified for general information that, the persons mentioned in column No.2 of the following table, have been nominated on the Standing Committee of the university, by the Academic Council and the Senate in their meeting held on 12.2.2014 & 29.3.2014 respectively for the remaining term of the Standing Committee, under the provisions of Section 50 of the Maharastra Universities Act, 1994 as mentioned in column No. 3 of the said table.

TABLE

Sr. No.	Nominated members	Relevant provisions of M.U.Act, 1994
1.	2.	3.
1.	Dr.G.R.Bamnote Prof.Ram Meghe Institute of Technology & Research, Badnera, Dist. Amravati. **(One Person from the Academic Council - DT/NT Category)**	*50(2)(c)* Nominated by the Academic Council
2.	Shri R.M.Kadu, Sipna Shikshan Prasarak Mandal, Sipna Parisar, Nimbhora, Badnera Road, Armavati. **(One Member from the Academic Council)**	*50(2)(c)* Nominated by the Academic Council
3.	Dr.Mohd.Samiullah Govt. Vidarbha Institute of Science and Humanities, Amravati. **(One Dean from the Senate)**	*50(2)(a)* Nominated by the Senate

Sd/-
(Dineshkumar Joshi)
Registrar
Sant Gadge Baba Amravati University

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NOTIFICATION

No. 47/2014

Date:24/4/2014

Subject : Increase in additional chances for failures students of B.Pharm. Courses

It is notified for general information of all concerned that the authorities of the University have decided to increase the additional two chances for the failure students of B.Pharm.Part-I, II & III of Annual Pattern i.e. Upto Summer-2015.

Sd/-
(Dineshkumar Joshi)
Registrar
Sant Gadge Baba Amravati University

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NOTIFICATION

No.48/2014

Date:24/4/2014

Subject : Corrigendum to Notification No.149 of 2012

It is notified for general information of all concerned that the authorities of the University have decided to add the following Point in Notification No.149 of 2012, after para No.4.

"5) This scheme of promotion will be applicable to the students admitted in B.Pharm. IInd year in absorption scheme given in aforesaid notification."

Sd/-
(Dineshkumar Joshi)
Registrar
Sant Gadge Baba Amravati University

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NOTIFICATION

No.49/2014

Date:24/4/2014

Subject : Recommended Books for B.Pharm.

It is notified for general information of all concerned that the authorities of the University have prescribed the following books as reference books for B.Pharm.Sem-IV & V (Theory) and B.Pharm. Sem-I & II (Practical) :

i) A Text Book of Principles and Fundamentals in Pharmacology, Volume-I, by Dr.D.M.Sakarkar, Dr.S.V.Tembhurne, Ms.B.H.More, Published by Nirali Prakashan, for the subject Pharmacology-I (Theory) of B.Pharm. Semester-IV and Pharmacology-II (Theory) of B.Pharm.Semester-V.

ii) A Text Book of Principles and Fundamentals in Pharmacology, Volume-II, by Dr.D.M.Sakarkar, Dr.S.V.Tembhurne, Ms.B.H.More, Published by Nirali Prakashan for the subject Pharmacology-I (Theory) of B.Pharm. Semester-IV and Pharmacology-II (Theory) of B.Pharm.Semester-V.

iii) Laboratory Manual of Pharmaceutical Engineering, Dr.D.M.Sakarkar, Suresh G.Sudke, Published by Nirali Prakashan for the subject Pharmaceutical Engineering-I (Practical) of B.Pharm. Semester-I and for the subject Pharmaceutical Engineering-II (Practical) of B.Pharm. Semester-II.

Sd/-
(Dineshkumar Joshi)
Registrar
Sant Gadge Baba Amravati University

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NOTIFICATION

No. 50/2014 Date:24/4/2014

Subject : Additional chances for B.Sc. Part-I, II, III (Home Science) (Annual Pattern) and M.Sc. Part-I & II (Home Science) (Annual Pattern) (All Specializations)

It is notified for general information of all concerned that the authorities of the University have decided to increase the additional two chances i.e. upto Summer-2015 for B.Sc. Part-I, II, III (Home Science) (Annual Pattern) and M.Sc.Part-I & II (Home Science) (Annual Pattern) (All Specializations).

Sd/-
(Dineshkumar Joshi)
Registrar
Sant Gadge Baba Amravati University

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NOTIFICATION

No.51/2014 Date:24/4/2014

Subject : PROPOSALS REGARDING CHANGES IN SYLLABI.

It is notified for general information of all concerned that the authorities of the University have provided the following corrections/additions/substitutions in the Prospectus of B.Tech. (Cosmetics) (Semester Pattern).

Corrections/Substitution/Additions in Prospectus of B.Tech. (Cosmetics)

Sr. No.	Reference in Prospectus	Corrections/Additions/Substitutions
1	B.Tech. (Cosmetics) Sem-I Prospectus No.20131910, Page No.20 Subject : 1.1 Cosmetic Technology-I Practical	The contents of Practical from Sr.No.1) to 5) be substituted by the following contents :- *1) Preparation of ointment bases-* *a) Hydrocarbon, b) Absorption, c) Water soluble* *d) Water miscible* *2) Preparation of paste and jelly bases.* *3) Preparation of simple stick bases.* *4) Preparation of cosmetics like cleansing cream, lotion cold cream, vanishing creams at least two examples from each category.*
2	B.Tech. (Cosmetics) Sem-I Prospectus No.20131910, Page No.25 Subject : 1.6 Mathematics & Statistics-I Theory	The contents of Sr.No.3) be substituted by the following contents. *3) Integral Calculus :- Indefinite Integral method of substitution, integration by part integration of algebraic function*
3	B.Tech. (Cosmetics) Sem-II Prospectus No.20131910, Page No.26 Subject : 2.1 Cosmetic Technology-II Practical	The contents of Practical from Sr.No.1) to 4) be substituted by the following contents :- *1) Preparation of various types of Emulsions o/w & w/o.* *2) Identification of types of Emulsions.* *3) Preparation of simple mixtures.* *4) Preparation of suspension.* *5) Stability study of suspension by use of thickening agents-Flocculating agents.*
4	B.Tech. (Cosmetics) Sem-II Prospectus No.20131910, Page No.31 Subject : 2.6 Mathematics & Statistics-II Theory	**i) In Sr.No.** '1) Integral Calculus' the words '*Indefinite quteral method of substitution, integration by part integration of algebraic function*' be deleted. **ii) The following contents be added after Sr.No.3).** *4) Differential Equations :- Formation and derivation, order and degree, linear equation with constant coefficient, homogeneous linear equations (first method of solution only) Simultaneous differential equations which are linear and of first order.*
5	B.Tech. (Cosmetics) Sem-III Prospectus No.20141911, Page No.20 Subject : 3.2 Cosmetic Chemistry-III Practicals	In Practical Sr.No.1), the contents 'Two structure synthesis of selected raw material used in cosmetics preparation atleast 10 preparations' be substituted by "*Analysis of excipient used in cosmetics.*"
6	B.Tech. (Cosmetics) Sem-III Prospectus No.20141911, Page No.22 Subject : 3.4 Perfume & Colours-II Practicals	In Practical Sr.No.1), the following contents be added. 2) Identification of perfume oil. 3) Identification of flavours. 4) De-odourization of Alcohol. 5) Synthesis of nitrobenzene by nitration. 6) Synthesis of Benzyl from Benzoin by oxidation.

Sd/-
(Dineshkumar Joshi)
Registrar
Sant Gadge Baba Amravati University

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NOTIFICATION

No. 52/2014 Date:24/4/2014

Subject : Ceasation of membership of Dr.R.S.Sapkal on the Board of Studies in Chemical & Polymer Technology.

It is notified for general information of all concerned that the membership of Dr.R.S.Sapkal, Head, Department of Chemical Technology, Sant Gadge Baba Amravati University on the Board of Studies in Chemical & Polymer Technology under the provision of 37 (2) (a) of the Maharashtra Universities Act, 1994 now stands ceased w.e.f. 16/04/2014 in accordance with the provision of Section 43 of the said act, as he has been relieved from the Head of Univesity Department.

By virtue of his membership on the Board of Studies, the membership acquired by him on any other authorities of the University shall also stand ceased.

Sd/-
(Dineshkumar Joshi)
Registrar
Sant Gadge Baba Amravati University

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NOTIFICATION

No.53/2014 Date:24/4/2014

Subject: Implementation of the Syllabus of the subject "Network Analysis".

It is notified for general information of all concerned that the authorities of the University have accepted that the syllabus prescribed for the subject " 4XT03/4XN03/4IE03 : Network Analysis"of B.E. Semester IV (Electronics & Tele.Engg./Electro.Engg./Instrumentation Engg.) for the session 2013-2014 shall be implemented for the subject "4BM03 : Network Analysis" of B.E. Semester IV (Biomedical Engineering) in the Faculty of Engineeering & Technnology as it is and appended below as Appendix-'A' for the session 2013-2014.

Sd/-
(Dineshkumar Joshi)
Registrar
Sant Gadge Baba Amravati University

Appendix-'A'

Syllabus prescribed for the subject 4BM03 '*Network Analysis*' of B.E.Sem.IV(Biomedical Engineering)

Section – A

Unit I : Basic Circuit elements : Circuit components-assumptions for cicuit analysis, sources of electrical energy-standard input signals-Kirchoff's laws-source transformation-mesh and node analysis-network equatioin for RLC network-magnetic coupling. (10 marks)

Unit II : Graph theory and network equation- graph of a network-trace and loops, cut set of a network, tie-set matrix and loop- currents analysis of network, network equilibrium equation, daulit-network transformation (10 marks)

Unit III : Transformation of a circuit into S-domain: transformed equivalent of inductunce'capacitance and mutual inductunce-impedance and admittance in the transformed domain-node analysis and mesh analysis of the transformed circuit- nodal admittance metrix and mesh impedience metrix in the domanin solution of transformed circuits including mutually coupled circuits impute and transfer immittance functions-transfer functions-impulse response and transfer function-poles and zeros-pole zero plots . (10 marks)

Section - B

Unit IV : Network theorems:- super positon theorem-reciprociti-theorem- Thevenin's theorem-Nortons's theorems-Millian's theorem-Max-power transfor theorem-substittutiion theorem-compensation theorem, Telligen's theorems (10 marks)

Unit V : Two-port network: open circuit impedience parameters-short circuit admittance-transmeters parameters-Inverse transmission parameters- hybrid and inverse hybrid parameters, interrelation between parameters-two port symetric interconnection of two-port networks, input impedience in terms of two port parameters output of impedience-image impedacne (10 marks)

Unit VI : Network functions: ports and terminal pairs –network functions poles and zeros-necessary conditions for driving point functions-necessary conditions for transfer function-applications of network analysis in driving network fuctions-positive real functions-driving point and transfer impedicnec function-LC network (10 marks)

Text Books :

1. Network and Systems D.Roy Choudhary (Wayle Estern ltd. 1988)
2. Ciruit Theory-ISKV Aiyer (Tata Mcgraw Hill).
3. Network Analysis, M.A.E. Van Valkenburg (Prentice Hall India), 3rd Edition

Practicals –

About 10 experiments based on the above syllabus.

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NOTIFICATION

No.61/2014 Date: 8/5/2014

Subject : **Continuation of Prospectus No.2013122 prescribed for B.Sc.Part-II (Sem-III & IV)**

It is notified for general information of all concerned that the Prospectus of B.Sc.Part-II (Sem-III & IV) bearing No.2013122 prescribed for the Academic Session 2012-13 shall continue for the session 2014-15 along with the following substitution.

The syllabi of B.Sc.Part-II Sem-III '3S Chemistry' printed on page Nos.14-20 and B.Sc.Part-II Sem-IV '4S Chemistry' printed page Nos.20-27 be substituted by the following Appendix-A & Appendix-B respectively.

Sd/-
(Dineshkumar Joshi)
Registrar
Sant Gadge Baba Amravati University

Appendix-A

3S Chemistry
(Effective from session 2014-15)

The examination in Chemistry of Third semester shall comprise of one theory paper, internal assessment and practical examination. Theory paper will be of 3 Hrs. duration and carry 80 marks. The internal assessment will carry 20 marks. The practical examination will be of 6 hours duration and carry 50 marks.

The following syllabi is prescribed on the basis of six lectures per week and 6 practical periods per batch per week. Each theory paper has been divided into 6 units. There shall be one question in every unit with internal choice for each of 12 marks & one compulsory question covering all the syllabus of Semester-III (8 marks).

B.Sc. Part- II (Semester- III)
3S Chemistry

Total Lectures: 84 *Marks: 80*

Note: Figures to the right hand side indicate number of lectures.

Unit I 14L

A] Covalent Bonding:

Molecular Orbital Theory. Postulates of MO theory. LCAO approximation. Formation of bonding and antibonding MOs. Rules for LCAO. MO energy level diagram. Concept of bond order. MO structure of homonuclear diatomic molecules of namely He_2, H_2, N_2 and O_2. Stability sequence of species of O_2 i.e. O_2, O_2^+, O_2^{2+}, O_2^- and O_2^{2-}. Paramagnetic nature of O_2. MO structure of heteronuclear diatomic molecules viz. NO, HF and CO (Coulson's structure). Explanation of important properties of CO viz. - triple bond, almost nonpolar nature, electron donor and acceptor behaviour. Comparison of VB and MO theories. [6]

B] Metallic Bonding:

Free electron theory and properties of metals such as electrical and thermal conduction, malleability, ductility and metallic lusture. VB theory or Resonance theory of metals. Band theory to explain nature of conductors, insulators and semiconductors (both intrinsic and extrinsic). [3]

C] VSEPR Theory:

Various rules under VSEPR theory to explain molecular geometry (following examples may be taken to explain various rules- $BeCl_2$, BF_3, CH_4, NH_4^+, PCl_5, SF_6, IF_7, $SnCl_2$, NH_3, H_2O, SF_4, ClF_3, BrF_5, XeF_6, SOF_4, COF_2, PCl_3,). Limitations of VSEPR theory. [5]

Unit II - Theory of Quantitative Inorganic Analysis 14L

A] Volumetric Analysis:

(a) Introduction:-Volumetric analysis, titrant, titrate, end point, equivalence point, indicator etc. Requirements of volumetric analysis. Definition of standard solution, primary standard substance. Requirements of primary standard substance. Terms to express concentrations namely- molarity, normality, molality, mole fraction and percentage. (Simple numericals expected).

(b) Acid-Base titrations:- Types of acid base titrations. pH variations during acid base titration. Acid base indicators. Modern theory (Quinoniod theory) of acid base indicators. Choice of suitable indicators for different acid base titrations.

(c) Redox Titrations:-General principles involved in redox titrations (redox reactions, redox potentials, oxidant, reductant, oxidation number). Brief idea about use of $KMnO_4$, $K_2Cr_2O_7$as oxidants in acidic medium in redox titrations. Use of I_2 in iodometry and iodimetry. Redox indicators-external and internal indicators. Use of starch as an indicator. Iodometric estimation of Cu (II). [8]

B] Gravimetric Analysis:

Definition. Theoretical principles underlying various steps involved in gravimetric analysis with reference to estimation of barium as barium sulphate. Coprecipitation and post precipitation. (Definition, types and factors affecting). [6]

Unit III 14L

A] Aldehydes and Ketones:

Preparation of acetaldehyde from ethanol, ethylidene chloride and acetylene. Preparation of benzaldehyde from benzene (Gattermann-Koch reaction) and toluene. Preparation of acetone from isopropyl alcohol, isopropylidene chloride and propyne. Preparation of acetophenone from benzene and ethyl benzene. Structure of carbonyl group, acidity of α-hydrogen in carbonyl compounds. Reactions of aldehydes &/or ketones: Cannizaro's, Reformatsky, Perkin with mechanism, Mannich reaction, Benzoin and Aldol condensations. Clemmensen, Wolf-Kishner, MPV and $LiAlH_4$ reductions. [8]

B] Carboxylic acids:

Structure and reactivity of carboxylic groups. Acidity of carboxylic acids, effects of substituents on acids strength. Oxalic acid: Preparation from ethylene glycol and cyanogen. Reactions: Reaction with ethyl alcohol, ammonia, glycerol and action of heat.

Lactic acid: Preparation from acetaldehyde and pyruvic acid. Reactions: Reaction with ethanol,PCl_5, action of heat, oxidation and reduction. Benzoic acid: Preparation from toluene, benzyl alcohol, phenyl cyanide and benzamide. Reactions : Reaction with ethanol, PCl_5 and ammonia. Salicylic acid: Preparation by Reimer-Tiemann reaction. Reactions: Reaction with CH_3COCl, CH_3OH and C_6H_5OH. [6]

Unit IV 14L

A] Optical isomerism:

Element of symmetry, chirality, asymetric carbon atom, enantiomers, diastereoisomers, relative and absolute configurations, DL and RS nomenclature, racemisation and resolution (by chemical method). [4]

B] Geometrical isomerism:

Cis-trans & *E-Z* nomenclature, Methods of structure determination. [3]

C] Conformational isomerism:

Bayer's Strain theory and its limitations. Stability of cycloalkanes, conformational isomers of ethane, n-butane and cyclohexane, their energy level diagrams. Newman & Sawhorse projection formulae. [7]

Unit V 14L

A] Thermodynamics and Equillibrium: [10]

(i) Gibb's and Helmholtz's free energy function. Physical significance of Gibb's free energy, Change in free energy as a criteria of spontaneity and equilibrium. Variation of free energy G with P & T. Gibb's-Helmholtz's equation in terms of G and its application. (ii) Partial molal function, chemical potential, derivations of Gibb's-Duhem equation. Chemical potential of an ideal gas in gaseous mixture. Derivation of vant Hoff's isotherm and its application to equilibrium state. Derivation of vant Hoff's equation and its applications. (iii) Numericals. [4]

B] Phase Equillibrium:

(i) Immiscible liquids, Nerst distribution law and its application to association and dissociation of solute in one of the solvent. Process of extraction, derivation of formula for the amount of solute left unextracted after n^{th} extraction. (ii) Phase transition - Clausius-Clyperon equation (only qualitative statement). (iii) Partially miscible liquids - Phase diagram of phenol-water, triethyl amine - water and nicotine-water systems. (iv) Numericals.

Unit VI 14L

A| Liquid state: [4]

(i) Surface tension, determination and its S.I. Unit. Effect of temperature on surface tension, derivation of expression for relative surface tension by Drop number method. Application of surface tension. (ii) Viscosity, determination and its S.I. Unit. Effect of temperature on viscosity, derivation of expression for relative viscosity by Ostwald's viscometer method. Applications of viscosity.

B] Electrochemistry: [10]

(i) Conductance of electrolyte solution. Specific, equivalent and molar conductance. Determination of conductance of electrolyte solution, variation of specific and equivalent conductance with dilution for strong electrolyte. Conductometric titrations. Applications of conductometric titration. (ii) Migration of ions under the influence of electric field. Transport number of ions. Determination of transport number by Hottorf's method and Moving boundary method (iii) Kohlrausch's law of independent migration of ions. Determination of λ_∞ and degree of dissociation α of a weak electrolyte. Determination of dissociation constant of weak electrolyte. (iv) Numericals.

Semester- III

3S Chemistry Practicals

Total Laboratory sessions: 26 **Marks: 50**

Exercise I:

a) Volumetric Analysis

(Standard solutions to be prepared by students only) **16 Laboratory sessions**

1) Prepare 0.1N oxalic acid standard solution and find out the acid neutralizing capacity of an antacid using NaOH as an intermediate solution.
2) Prepare 0.1N H_2SO_4 solution and find out its exact normality using NaOH as an intermediate solution and 0.1N oxalic acid as standard solution.
3) To determine the strength of oxalic acid by titration with $KMnO_4$.
4) To determine percentage purity of Ferrous Ammonium Sulphate (FAS) by titration with $KMnO_4$.
5) To determine strength of FAS by titration with $K_2Cr_2O_7$ using internal indicator.
6) To determine strength of $K_2Cr_2O_7$ by titration with FAS using internal indicator.
7) Estimation of copper (II) in commercial copper sulphate sample by iodometric titration.

b) Gravimetric Analysis

Estimation of Ba^{2+} as $BaSO_4$, Fe^{3+} as Fe_2O_3 using china and silica crucible and Ni^{2+} as Ni-DMG using sintered glass crucible.

Exercise II: Physical Chemistry experiments **10 Laboratory sessions**

1) To determine refractive index by Abbe's refractometer.
2) To construct phase diagram of phenol-water system and to determine consolute temperature for the system.
3) To determine transition temperature of $MnCl_2.4H_2O$.
4) To study kinetics of hydrolysis of methyl acetate catalyzed by acid.
5) To study kinetics of saponification of ethyl acetate by NaOH. (Equal concentration)
6) To determine partition coefficient of benzoic acid between benzene and water.
7) To determine partition coefficient of iodine between CCl_4/Kerosene and water.
8) To determine solubility of benzoic acid at different temperature and heat of solution.

Distribution of Marks for Practical Examination

Time: 6 hours (One Day Examination) Marks: 50

Exercise-I	.....	18
Exercise-II	.....	18
Viva-Voce	.....	07
Record	.....	07
	Total :	50

Appendix-B

Syllabus Prescribed for B.Sc. Part- II (Semester- IV).
B.Sc. Part- II (Semester- IV)
4S Chemistry

Total Lectures: 84 *Marks: 80*

Note: Figures to the right hand side indicate number of lectures.

Unit I 14L

A] Chemistry of elements of transition series: [11]

Definition of transition elements. General characteristics of transition elements. Comparative study of first transition series elements (3d) with reference to following properties: (i) Electronic configuration (ii) Atomic and ionic size (iii) Ionization energy (iv) Metallic nature (v) Oxidation states (vi) Magnetic properties (vii) Color of salts (viii) Catalytic properties (ix) Complex formation behaviour. Study of 4d and 5d series elements-Electronic configuration. Comparison of 3d series elements with 4d and 5d series elements with respect to size, oxidation states, magnetic properties and color.

B] Extraction of elements: [3]

Principles involved in extraction of elements. Major methods of extraction of elements. Factors affecting choice of extraction method. Thermodynamics of reduction processes-Ellingham diagrams for oxides and importance of this diagram (only preliminary ideas).

Unit II 14L

A] Inner transition elements:

Definition, Lanthanides and Actinides. Comparative study of Lanthanides with respect to following properties:(i) Electronic configuration (ii) Atomic and ionic radii lanthanide
contraction-definition, cause and effect of lanthanide contraction (iii) Oxidation states (iv) Magnetic properties (v) Color of salts (vi) Complex formation behavior. Occurrence of lanthanides. Isolation of lanthanides by ion exchange method. Actinides- Electronic configuration and oxidation states. Comparison of lanthanides and actinides. [11]

B] General Principles of Metallurgy:

Definition of metallurgy, steps in metallurgy. Ore dressing by gravity separation, froath floatation and electromagnetic separation. Calcination, roasting, smelting and refining of metals. Meaning of termshydrometallurgy and pyrometallurgy. [3]

Unit III 14L

A] Polynuclear hydrocarbons:

Naphthalene - Haworth synthesis,orbital picture, Reactions – electrophilic substitution (orientation) Preparation of naphthols from naphthalene sulphonic acids and naphthylamines from naphthols. [4]

B] Reactive methylene compounds:

Malonic Ester: Synthesis from acetic acid, Synthetic applications- Synthesis of acetic acid , succinic acid, glutaric acid, crotonic acid and malonyl urea. Acetoacetic ester: Synthesis from ethyl acetate, Synthetic applications- Synthesis of acetic acid, propionic acid, isobutyric acid, succinic acid, glutaric acid, crotonic acid, acetyl acetone and 4-methyl uracil. [6]

C] Carbohydrates:

Constitution of glucose, cyclic structure, Pyranose and Furanose structure, Epimerization, conversion of glucose to fructose and vice-versa, Introduction to fructose, ribose, 2- deoxyribose, maltose, sucrose. (their structures only- determination not needed). [4]

Unit IV 14L

A] Aromatic nitro compounds:

Nitrobenzene: Synthesis from benzene, Reduction of nitrobenzene in acidic, neutral and alkaline medium. [3]

B] Amino Compounds:

Basicity and effect of substituents. Methods of preparation of aniline from nitrobenzene, Reactions: with acetyl and benzoyl chlorides, $Br_2(aq)$ and $Br_2(CS_2)$, Carbylamine reaction, alkylation,Hoffmann's exhaustive methylation and its mechanism. [4]

C] Diazonium Salts:

Preparation benzene diazonium chloride, Synthetic applications- Preparation of benzene,phenol, halobenzene,nitrobenzene,benzonitrile, coupling with phenol and aniline. [3]

D] Amino acids and Proteins:

Classification, Strecker and Gabrial phthalimide synthesis, Zwitterion structure, Isoelectric point, peptide synthesis. Structure determination of polypeptides by end group analysis. [4]

Unit V - Colligative Properties of Dilute Solutions: 14L

(i) Defination and examples of colligative properties.(ii) Elevation of boiling point, thermodynamic derivation of the relationship between elevation of boiling point and molar mass of a non-volatile solute. Cotrell's method for determination of elevation of boiling point. (iii) Depression of freezing point, thermodynamic derivation of the relationship between depression of freezing point and molar mass of a non-volatile solute. Rast's method for determination of depression of freezing point. (iv) Abnormal behavior of solution. Van't Hoff's factor 'i'. Determination of degree of association and dissociation from Van't Hoff's factor.(v) Numericals.

Unit VI- Crystalline state 14L

Symmetry in crystal, plane of symmetry, axis of symmetry and point of symmetry. Law of constancy of interfacial angles. Elements of symmetry in cubic crystals. Laws of symmetry. Law of rational indices, Weiss and Miller indices of a lattice planes, calculation of interplaner distance d(h,k,l) from Miller indices in a cubic system. Seven crystal systems and fourteen Bravais lattices, Bravais lattices of cubic system. Simple cubic system (S.C.C.), body centered cubic system (B.C.C.) and face centered cubic system (F.C.C.). Calculation of number of constituent units in S.C.C., B.C.C. and F.C.C. Ratio of interplaner distances for 100, 110 and 111 lattice plane in S.C.C., B.C.C. and F.C.C. (No geometrical derivation). Derivation of Bragg's equation for X-ray diffraction, Bragg's X-ray spectrometer method for the determination of crystal structure of NaCl and KCl. Anomalous behaviour of KCl towards X-ray. Numericals.

Semester- IV
4S Chemistry Practicals

Total Laboratory sessions: 26 Marks: 50

Exercise I: Inorganic estimations 14 Laboratory sessions

1) Chromatographic separation of binary mixture containing Cu(II), Co(II) and Ni(II) ions by paper chromatography and determination of R_f values.
2) Estimation of Zn(II) by complexometric titration.
3) To determine the strength of unknown calcium salt solution by complexometric titration.
4) Estimation of hardness of water by complexometric titration.
5) Colorimetric or spectrophotometric estimation of Cu(II) in commercial copper sulphate sample as ammonia complex.
6) To determination of concentration of unknown $KMnO_4$ solution from standard solutions of $KMnO_4$ by colorimetrically or spectrophotometrically.

Exercise II: Organic Chemistry Practicals — 12 Laboratory Sessions

1. Isolation of casein from milk.
2. Isolation of nicotine from tobacco leaves.
3. Isolation of caffine from tea leaves.
4. Isolation of lycopene from tomato juice.
5. Estimation of glucose.
6. Estimation of acetamide.
7. Determination of equivalent weight of an organic acid.

Distribution of Marks for Practical Examination

Time: 6 hours (One Day Examination) — Marks: 50

Exercise-I	.....	18
Exercise-II	.....	18
Viva-Voce	.....	07
Record	.....	07
	Total:	50

Books Recommended: (Common for Semester III and Semester IV)

1. Principles of Inorganic Chemistry by Puri, Sharma and Kalia- S. Naginchand & Co., Delhi.
2. Text book of Inorganic Chemistry by A.K. De, Wiley East Ltd.
3. Selected Topics in Inorganic Chemistry by Malik, Tuli and Madan- S. Chand & Co.
4. Modern Inorganic Chemistry by R.C. Agrawal, Kitab Mahal.
5. Instrumental Methods of analysis by Chatwal and Anand, Himalaya Publishing House.
6. Concise Inorganic Chemistry by J.D. Lee, ELBS.
7. Inorganic Chemistry by J.E. Huheey- Harper & Row.
8. Fundamental concepts of Inorganic Chemistry by E.S. Gilreath, McGraw Hill book Co.
9. Modern Inorganic Chemistry by W.L. Jolly, McGraw Hill Int.
10. Chemistry Facts, Patterns & Principles by Kneen, Rogers and Simpson, ELBS.
11. Theoretical Principles of Inorganic Chemistry by G.S. Manku, Tata McGraw Hill.
12. Inorganic complex compounds by Murmann, Chapman & Hall.
13. Text book of Inorganic Chemistry by K.N. Upadhyaya, Vikas Publishing House, Delhi.
14. Advanced Practical Inorganic Chemistry by Gurdeep Raj, Goel Pulishing House, Meerut.
15. Co-ordination Chemistry by D. Banerjee, TMH Publication.
16. Text book of Inorganic Chemistry by Nema, Agrawal, Solanki, Morkhade, Meshram, Berad.
17. Text book of Inorganic Chemistry by Bhadange, Pagariya, Deshmukh, Joshi, Bombatkar, Mandlik, Bokey Prakashan, Amravati.
18. Organic Chemistry by R.T. Morrison & R.T. Boyd, 6th edition, PHI.
19. Organic Chemistry by Pine, 5th edition.
20. Organic Chemistry Vol. I, II and III by Mukharjee, Singh and Kapoor- Wiley Eastern.
21. Organic Chemistry by S.K. Ghosh.
22. Reaction Mechanism in Organic Chemistry by S.M. Mukharjee and S.P. Singh.
23. Spectroscopy of Organic Compounds by P.S. Kalsi.
24. Stereochemistry and mechanism through solved problems by P.S. Kalsi.
25. Organic Chemistry by TWG Solomons, 4th edition, John Wiley.
26. Hand Book of Organic Analysis by H.J. Clarke, Arnold Heinmen.

27. Text book of Practical Organic Chemistry by A. I. Vogel.
28. Text book of Organic Chemistry by Wadodkar, Raut, Dighade, Thakre, Kale, Kadu, Chincholkar.
29. Text book of Organic Chemistry by P.S. Kalsi published by Macmilllan India Ltd., 1999, Delhi.
30. Practical Organic Chemistry by F.G. Mann, B.C. Saunders, Orient Longman.
31. Comparative Practical Organic Chemistry (Qualitative Analysis) by V.K. Ahluwalia and Sunita Dhingra, Orient Longman.
32. Comprehensive Practical Organic Chemistry (Preparation and Qualitative Analysis) by V.K. Ahluwalia and Renu Agrawal, Orient Longman.
33. Text book of Organic Chemistry by Deshmukh, Awinashe, Tayade, Wadekar, Meshram, Parhate, Bokey Prakashan, Amravati.
34. Physical Chemistry: Walter, J. Moore, 5th edn., New Delhi.
35. Physical Chemistry: G.M. Barrow, McGraw Hill, Indian Edn.
36. Principles of Physical Chemistry: Maron and Prutton.
37. Principles of Physical Chemistry: Puri, Sharma and Pathaniya.
38. Physical Chemistry: P.W. Atkins, 4th Edn.
39. Text book of Physical Chemistry: P.L. Sony, O.P. Dharma.
40. Physical Chemistry: Levine.
41. Practical Physical Chemistry: Palit and De.
42. Practical Physical Chemistry: Yadao.
43. Practical Physical Chemistry: Khosla.
44. Laboratory Mannual of Physical Chemistry: W.J. Popiel.
45. Practical Chemistry: Dr. S.B. Lohiya, Bajaj publication, Amravati.
46. Text book of Physical Chemistry: Satpute, Kabra, Raghuwanshi, Wankhade, Jumle and Murarka.
47. Text book of Chemistry, B.Sc.-II, Third Semester & Fourth Semester, Nabh Prakashan.

List of equipments/apparatus required for the Chemistry Practicals for B.Sc.

1. Abbe's Refractometer	02 nos./batch
2. Viscometer	10 nos./batch
3. Stalagmometer	10 nos./batch
4. Melting Point Apparatus	10 nos./batch
5. Thermometer 0-360°C	20 nos./batch
6. Thermometer 0-110°C	20 nos./batch
7. Analytical balance	15 nos./batch
8. Weight box	15 nos./batch
9. Density Bottles	20 nos./batch
10. Kipp's Apparatus	02 nos./batch
11. Quick fit Distillation Assembly/Multipurpose assembly	10 nos./batch
12. Sintered Glass Crucible	20 nos./batch
13. Silica Crucible	20 nos./batch
14. Vacuum Suction Pump	02 nos./lab.
15. Potentiometer	02 nos./batch
16. Metzer Electronic one pan balance	01 nos./lab.
17. Filtration flask with Buckner Funnels	
100ml	10 nos./batch
250ml	05 nos./batch
500ml	02 nos./batch
18. Desiccators	10 nos./batch
19. Magnetic Stirrer	10 nos./batch
20. Water Suction	10 nos./batch
21. Conductometer with Conductivity Cell	04 nos./batch
22. Colorimeter	02 nos./batch
23. pH Meter	02 nos./batch
24. Chromatographic Jar	05 nos./batch
25. Separating funnels 250ml, 500ml	05 nos./batch
26. Hot Air Oven	02 nos./lab.
27. Hot-Cold Air Blower	01 no./lab.
28. Centrifuge machine (Electrically Operated)	02 nos./lab.
29. Deioniser/ Water Still (Electrically Operated)	01 no./lab.
30. Hot Plate/ Heating Mantle	05 nos./batch
31. Models of Elements (Seven Crystal types and their symmetry)	01 no./batch
32. Flame Photometer	02 nos./batch
33. Spectrophotometer	02 nos./batch
34. Shaking Machine	01 no./batch
35. Polarimeter	02 nos./batch

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