



# **Syllabi of Subjects at Undergraduate Level**

## **University of Jammu**

# **Faculty of Science**

# INDEX

S.No.	Faculty of Science
1.	Geography
2.	Food Science & Quality Control
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# Geography

# **Semester-I**

**Title: Physical Geography**

**Distribution of Marks:**

**Theory: 80**

**Internal: 20**

**Total Marks: 100**

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**Objectives:**

**The objective of this course is to introduce the latest concepts in Physical Geography, essentially Geomorphology to the students of Geography in a brief but adequate manner.**

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<b>Unit-I</b>	<b>No. of Lectures</b>
1:1 Definition, Nature and Scope of Geography	2
1:2 Division of Geography	2
1:3 Physical Geography and its components	1
1:4 Geography and other disciplines	1
<b>Unit-II</b>	
2:1 Theories regarding origin of the earth:Nebular, Kant and Planetesimal Hypothesis	2
2:2 Theory of Continental Drift	1
2:3 Theory of Plate Tectonics	1
2:4 Geological Time Scale	2
<b>Unit-III</b>	
3:1 Interior of the Earth	1
3:2 Rocks and their Types	2
3:3 Earth Movements – Earthquakes and Volcanoes	2
3:4 Weathering and Erosion	1
<b>Unit-IV</b>	
4:1 Fluvial and Glacial Landforms	2
4:2 Karst and Aeolian Landforms	2
4:3 Soil Erosion and Conservation	1
4:4 Landslides and Avalanches	2
Total Number of lectures:	25

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**Note for Paper Setters:**

The Question Paper shall comprise of two sections – A&B. Section A shall be compulsory and shall comprise of 8 short answer questions of 2 marks each. Answer should be limited to 20 words. Candidate shall be required to attempt all the 8 questions. Section-B shall comprise of 8 questions from 4 Units. Candidates shall be required to attempt one question from each unit and each question shall be of 16 marks. Answer should be limited to 450 words for each question.

**Suggested Readings:**

1. Monkhouse, F.J: Principles of Physical Geography, Hodder and Stoughton, London, 1960.
2. Singh, S: Physical Geography, Prayag Pustak Bhawan, Allahabad, 1998.
3. Strahler, A.N. Environmental Geo-Science, Hamillon Publishing, Santa Barbara, 1973.
4. Strahler, A.N.,and Strahler. A.H., Modern Physical Geography John Wiley and Sons, Reised Edition, 1992.
5. Thornbury, W.D., Principles of Geomorphology, Wiley Eastern, 1969.
6. Wooldrige S.W. and Morgan, R.S., Te Physical Basis of Geography and Geomorphology, Longman Green & Co. London, 1959.

**Title: Cartography-I (Practical)****Distribution of Marks:**

**External Practical: 25**  
**Internal Practical: 25**  
**Total Marks: 50**

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**Objectives:**

**The objective of this practical course in Geography is to go through laboratory exercises on drawing of scales, understanding different types of maps and drawing of relief features of geographical significance.**

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**Unit – I**

- 1:1 Nature and Scope of Cartography
- 1:2 Maps – Definition and Classification

**Unit-II**

- 2:1 Scale – Definition and Types
  - 2:2 Representation of Relief Features with the help of Contours – V shaped valley, U shaped valley, Conical Hill and Plateau Slopes – Concave, Convex, Uniform and Terraced
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**Note for Practical Examiners:**

The practical examination will be conducted in one session of three hours duration. The question paper will be set out of two units. In all 8 questions will be set, four from Unit-I and four from Unit-II. Students will be required to attempt 4 questions i.e. 2 from each unit carrying 5 marks each.

**Marks Distribution:**

Practical Paper: 20 marks  
File : 02 marks  
Viva-voce : 03 marks

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**Suggested Readings:**

1. Mishra R.P. and Ramesh A., Fundamentals of Cartography, Mcmillan Co. New Delhi, 1986.
2. Pal, S.K., Statistics for Geoscientists – Techniques and Application. Concept Publishing, New Delhi, 1998.
3. Robinson, A.H. et.al: Elements of Cartography, John Wiley & Sons, U.A.A., 1995.
4. Sarkar A., Practical Geography: S Systematic Approach, Oriental Logman, Calcutta, 1997.
5. Singh R.L. and Dutt R.K., Elements of Practical Geography, Kalyani Publishers, New Delhi, 1979.

## **Semester-II**

**Title: Geography of Jammu & Kashmir**

**Distribution of Marks:**

**Theory: 80**

**Internal: 20**

**Total Marks: 100**

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**Objectives:**

The objective of this course is to make the students familiar with the Geography of Jammu & Kashmir, its physical, socio-cultural and economic setting.

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		No. of lectures
Unit-I		
1:1	J&K in the context of India	1
1:2	Physical Divisions	2
1:3	Climate	1
1:4	Drainage	2
Unit-II		
2:1	Natural Vegetation	1
2:2	Production of Distribution of Crops-Wheat, Rice, Maize	2
2:3	Horticulture and Sericulture	2
2:4	Livestock and Fisheries	1
Unit-III		
3:1	Mineral Resources – Coal and Cypsum	1
3:2	Hydel Power Resources	2
3:3	Industries – Forest Based, Agro Based and Handicrafts	2
3:4	Transport and Communication	2
UnitIV		
4:1	Population – Distribution, Growth and Density	2
4:2	Migration and Trans – Humane	2
4:3	Urbanisation	1
4:4	Tourism	1
Total number of lectures:		25

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**Note for Paper Setters:**

The Question Paper shall comprise of two sections – A&B. Section A shall be compulsory and shall comprise of 8 short answer questions of 2 marks each. Answer should be limited to 20 words. Candidate shall be required to attempt all the 8 questions. Section-B shall comprise of 8



questions from 4 Units. Candidates shall be required to attempt one question from each unit and each question shall be of 16 marks. Answer should be limited to 450 words for each question.

Suggested Readings:

1. Dhar Vidya: Jammu and Kashmir Past and Present, Saksham Jammu 2005.
2. Drew Frederic, 1971: Jammu & Kashmir Territories: A Geographical Account, Oriental Publishers, Delhi.
3. Frank Younghusband: Sir Kashmir, London.
4. G.B.Singh: Encyclopedia of Jammu.
5. Itoo J (2004) Jammu and Kashmir at Glance.
6. Jasbir Singh: The Economy of Jammu & Kashmir, R.K. Anand & Co. Jammu, 2004.
7. K. Warikoo (1976), Jammu, Kashmir & Ladakh: A classified Bibliography.
8. M.A. Stein (1982), Kalhana's Raja Larangani, The First Chromick Kashmir, 1 Bombay.
9. Majid Hussain, A Geography of Jammu & Kashmir. Ariana Publishing House New Delhi, 1985.
10. Somnath Dhar (1977), Jammu & Kashmir, NBT, Srinagar, Kesar Publishers.

**Title: Cartography-II (Practical)****Distribution of Marks:****External Practical: 25****Internal Practical: 25****Total Marks: 50**

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**Objectives:**

**The objective of this practical course in Geography is to understand and draw diagrams representing physical data. Secondly, students will be made to conduct field survey in the campus and go for field trip to understand geography in real sense.**

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**Unit – I**

- 1:1 Representation of Temperature and Rainfall Data with the help of Linegraph and Bargraph.
- 1:2 Climograph and Hytherograph and their interpretations

**Unit-II**

- 2:1 Chain and Tape Survey
  - 2:2 Field Work and Field Reports
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**Note for Practical Examiners:**

The practical examination will be conducted in one session of three hours duration. The question paper will be set out of Unit-I from which 4 questions will be set, out of which students will be required to attempt 2 questions. Unit-II is compulsory.

**Marks Distribution:**

Practical Paper:	10 marks
Survey :	06 marks
File :	02 marks
Viva :	03 marks
Tour Report :	04 marks

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**Suggested Readings:**

1. Mishra R.P. and Ramesh A., Fundamentals of Cartography, Mcmillan Co. New Delhi, 1986.
2. Pal, S.K., Statistics for Geoscientists – Techniques and Application. Concept Publishing, New Delhi, 1998.
3. Robinson, A.H. et.al: Elements of Cartography, John Wiley & Sons, U.A.A., 1995.
4. Sarkar A., Practical Geography: S Systematic Approach, Oriental Logman, Calcutta, 1997.
5. Singh R.L. and Dutt R.K., Elements of Practical Geography, Kalyani Publishers, New Delhi, 1979.

# **Food Science & Quality Control**

# **Semester-I**

## **BASIC NUTRITION & FOOD CHEMISTRY**

Duration of Examination: 3hrs

Max marks = 100  
External Assessment =80  
Internal Assessment = 20

### **OBJECTIVES:**

To enable the students to:

- a) Understand the relationship between nutrition and human well being.
- b) Know and understand the functions, importance of all nutrients for different age groups and special groups
- c) To know the major and minor components of foods.
- d) To know composition and properties of food.

### **UNIT – I**

- 1. Introduction to nutrition –functions of foods, definition of nutrition, nutrients, adequate optimum and good nutrition, malnutrition.Food as a source of nutrients.
- 2. Inter relationship between nutrition and health, visible symptoms of good health.
- 3. Food guide-basic five food groups and usage of food guide.
- 4. Use of food in body-digestion, absorption, transport, utilization of nutrients in the body.

### **UNIT – II**

- 1. Water as a nutrient, function, sources, requirement, structure, water balance – effect of deficiency.
- 2. Introduction to chemistry of water and ice.
- 3. Moisture in food: Hydrogenbonding, Bound water, Free water, Water activity and Food stability.
- 4. Energy – Unit of energy, food as a source of energy, energy value of food, the body's need for energy, B.M.R. activities. Utilizationof food for energy requirements
- 5. Acid – base balance.

### **UNIT – III**

1. Carbohydrates- composition, classification, sources, functions, structure, physical & chemical properties.
2. Other sweetening agents, functions of sugar in food (Browning reaction), changes during cooking and processing.
3. Lipids – composition, nomenclature, saturated, unsaturated fatty acids, classification, food sources, functions of fats.
4. Physical and chemical properties, emulsions, chemistry & technology of fat and oil processing. Role of food lipids in flavor
5. Proteins – composition, classification sources, functions, denaturation, and protein deficiency, determination of protein quality.
6. Amino acids – classification, Physio-chemical properties, modification of food protein through processing and storage.

### **UNIT – IV**

1. Mineral functions, sources, Bio-availability, and deficiency of following minerals – calcium, Iron, Iodine, Fluorine, sodium, potassium.
2. Vitamins – Classification, units of measurement, sources, functions and deficiency diseases caused by following vitamins:  
  
Fats soluble vitamins – Vitamin A, D, E and K  
  
Water soluble vitamins – Vitamin C and B-complex
3. Vitamins and minerals structure general causes of loss in food. Fortifications, Enrichment and Restoration.

### **UNIT – V**

1. Enzymes. Nomenclature, specificity, catalytic regulations, kinetics factors influencing enzyme activity, controlling enzyme action. Enzyme added to food during processing, modification of food by endogenous enzyme. Enzyme inhibitors in food.
2. Pigments indigenous to food, structure, chemical and physical properties. Effect of processing and storage.
3. Flavours – Vegetables, fruit and spice flavours, fermented food, Meat and sea food.

***NOTE FOR PAPER SETTING:***

The Question paper will consist of two sections.

**Section I:** (12x5=60) Consist of 10 long answer questions (2 from each unit, choice from within the unit). Each question carries weight age of 12 marks. The candidate will have to attempt five questions (at least one from each unit).

**Section II:** (4x5=20) Consist of 10 short answer question (2 from each unit). Each question carries weight age of 4 marks. The candidate will have to attempt any five questions.

## **PRACTICALS:**

Duration of Examination: 3hrs

Max marks:50  
External Assessment: 25  
Internal Assessment: 25

Recommended credits: 2 (3hrs. per week)

1. Experiments on properties of monosaccharides- Glucose,Fructose and Galatose
2. Experiments on properties of Disaccharides - maltose,lactose and sucrose.
3. Experiments on properties of Polysaccharides -starch
4. Estimation of glucose in a given sample.
5. Experiments on properties of amino-acids.
6. Experiments on properties of proteins
7. Experiments on properties of fats.
8. Saponification number of lipids.

## **REFERENCES:**

1. Damodran, S., Parkin, K.L and Fennema, D.R. (2007). Fennema's Food Chemistry. 4<sup>th</sup> edition. CRC Press.
2. Guthrie, H.A. (1983). Introductory nutrition. 5<sup>th</sup> Edition. Mosby, St. Louis.
3. Meyer, L.H. (2004). Food Chemistry. Textbook Publishers. ISBN: 0758149204.
4. Mudambi, S.R., Rao, S.M. and Rajagopal, M.V.(2006). Food science. 2<sup>nd</sup> Edition. New Age International publishers.
5. Mudambi, S.R and Rajgopal, M.V. (2001). Fundamentals of Foods and Nutrition. 4<sup>th</sup>Edition.new Age International Publishers.
6. Shakuntla, M.N and Shadaksharaswamy, M. (2013). Food Facts and Principles. New Age International.
7. Srilakshmi, B. Food science. 3<sup>rd</sup> Edition. NewAge International.
8. Swaminathan, M. (2012). Advanced Text book on food and Nutrition, Vol. II. The Bangalore Printing And.
9. Swaminathan, M. (2012). Handbook of Food & Nutrition. 5<sup>th</sup> Edition. Bangalore printing.
10. Willson, D. (1999). Evan Principles of Nutrition. 4th Edition. John Willey & Sons: New York.

## **Semester-II**

### **FOOD MICROBIOLOGY, SANITATION AND HYGIENE**

Duration of Examination:3hrs

Max marks = 100  
External Assessment =80  
Internal Assessment = 20

#### **OBJECTIVES:**

To help the students to

- a) Acquire an elementary knowledge about micro-organism.
- b) To develop an understanding of the role of microorganisms in environment, Industry and in maintenance of health.
- c) Understand the importance of safe handling of food.

#### **UNIT – I**

- 1. Introduction to microbiology and its relevance to everyday life-General morphology of micro-organisms – General characteristics of bacteria, fungi, virus, protozoa, algae.
- 2. The relationship of micro-organism to sanitation. Role of microbiology-Environment effects of microbial growth.
- 3. Effects of micro-organisms on food degradation and food bore illness – Bacteria, Virus, Molds, Yeasts and parasites.

#### **UNIT – II**

- 1. Control of macro-organisms growth curve – Effect of environmental factors on growth of micro organisms-pH, water activity – oxygen availability, temperature & others.
- 2. Microbial intoxications and infections – sources of contamination of foods toxic production and physiological action. Sources of infection of foods by pathogenic organisms, symptoms and method of control.
- 3. Beneficial effect of micro-organisms.
- 4. Relevance of microbiological standards for food safety.

#### **UNIT – III**



1. Microbiology of different foods – Spoilage and contamination- Sources, types, effects on the following:
  - a) Cereals & Cereals products.
  - b) Sugar & Sugar products.
  - c) Vegetables & Fruits.
  - d) Meat & Meat products.
  - e) Fish & other sea foods.
  - f) Eggs & Poultry.
  - g) Milk & Milk products.
  - h) Canned and other processed foods.
2. Other food hazards – chemicals, antibiotics, hormones, metals contamination – poisonous foods.
3. Food contamination – sources and transmission by water, air, sewage and soil as reservoirs of infection and mode of spread.
4. Other agents of contamination:

Human, domestic animals, vermins, birds.

#### **UNIT – IV**

1. Needed environment microbiology- water, air, soil & sewage.
2. Importance of personal hygiene of food handlers – clothes, illness. Education of food handler in handling and serving food
3. Safety in food procurement, storage, handling and preparation – control of spoilage – safety of left over foods.
4. Cleaning and sanitization. Products and methods – use of detergents and chemicals, tests for sanitiser's strength.

#### **UNIT – V**

1. Kitchen Sanitation:
  - Kitchen design-equipment and systems.
  - Structure and layout of food premises maintaining clean environment.
  - Selecting and Installing cleaning equipment.
2. Waste product handling: Planning for waste disposal. Solid waste and liquid waste.

3. Control of infestation:  
Rodent Control – Rats, Mice-Rodent,, proofing, destruction, Vector Control.Uses of pesticides.
4. Food Sanitation, Control and Inspection – Planning and implementation of training programmes for health personnel.

***NOTE FOR PAPER SETTING:***

The Question paper will consist of two sections.

**Section I:** (12x5=60) Consist of 10 long answer questions (2 from each unit, choice from within the unit). Each question carries weight age of 12 marks. The candidate will have to attempt five questions (at least one from each unit).

**Section II:** (4x5=20) Consist of 10 short answer question (2 from each unit). Each question carries weight age of 4 marks. The candidate will have to attempt any five questions.

**PRACTICALS:**

Max marks:50

Duration of Examination: 3hrs External Assessment: 25

Internal Assessment: 25

Recommended credits: 2 (3hrs. per week)

1. Microscope and its parts. Examination under low power/high power and oil immersion objectives.
2. Gram staining, Isolation and Identification.
3. Zheil-Nelsch staining.
4. Examination of yeasts, mould and non-pathogenic bacteria.
5. Study of sterilization equipments.
6. On the job training for 1 month during summer break.

## REFERENCES:

1. Adams, M.R and Mass, M.D. (2008). Food Microbiology. newAge International Pvt. LTd. Publishers.
2. Banwart, G.T. (1987). Basic Food Microbiology. CBS Publications:New Delhi.
3. Block, J.G. (1999). Microbiology Principles and Explorations. 4<sup>th</sup> Edition. John wiley and sons Inc.
4. Frazier, W.C. (1968). Food Microbiology. 4<sup>th</sup> Edition. McGraw Hill Inc.
5. Jay, J.M., Lossner, M.J and Golden, D.A. (2008). Modern Food Microbiology. 7<sup>th</sup> edition. Springer. ISBN: 0387231803
6. Kawata, J.G. (1963). Environment Sanitation in India. Lucknow Publishing House.
7. Longree, K. (1967). Quality Food Sanitation. McGraw Hill Publishers:New York.
8. Pelezar, H.J. and Rober, D. (1968). Microbiology. 2nd Edition. McGraw Hill:New York.

# Chemistry

# **Semester-I**

Title: **Inorganic Chemistry-I**  
Maximum Marks: **100**

## **Unit-I**

### **(a) Atomic Structure**

**10 Hrs.**

Idea of de Broglie matter waves, Heisenberg uncertainty principle, atomic orbital. Schrodinger wave equation, significance of quantum numbers, radial and angular wave functions and probability distribution curves, shapes of s, p, d orbitals. Aufbau and Pauli's exclusion principles, Hund's multiplicity rule, Electronic configurations of the elements, effective nuclear charge.

### **(b) Periodic Properties**

**06Hrs.**

Atomic and Ionic radii, ionization energy, electron affinity and electronegativity – definition, methods of determination of evaluation, trend in periodic table and applications in predicting and explaining the chemical behavior.

## **Unit-II**

### **(a) Chemical Bonding-I**

**13 Hrs.**

Covalent Bond. Valence bond theory and its limitations, directional characteristics of covalent bond, various types of hybridization and shapes of simple inorganic molecules and ions. Valence shell electron pair repulsion (VSEPR) theory and its applications to  $\text{NH}_3$ ,  $\text{H}_3\text{O}^+$ ,  $\text{SF}_4$ ,  $\text{ClF}_3$ ,  $\text{ICl}_2^-$ , and  $\text{H}_2\text{O}$ .

MO theory, homonuclear and heteronuclear (CO and NO) diatomic molecules, bond strength and bond energy, calculation of percentage of ionic character from dipole moment and electro negativity difference.

### **(b) Chemical Bonding-II**

**07 Hrs.**

Ionic solids, Ionic structures, radius ratio effect and coordination number, limitations of radius ratio rule, lattice defects, semiconductors, lattice energy and Born-Haber cycle, solvation energy and solubility of ionic solids, polarizing power and polarisability of ions.

Fajan's rules, Metallic bond-free electron, valence bond and band theories. Weak interactions-hydrogen bonding and van der Waals forces.

## **Unit-III**

### **(a) s-Block Elements**

**06Hrs**

General study, diagonal relationship, salient features of hydrides, solvation and complexation tendencies including their function in biosystems, an introduction to alkyls and aryls.

### **(b) p-Block Elements-I**

**08 Hrs.**

General study (including diagonal relationship) of groups 13-17 elements, compounds like hydrides, oxides, oxyacids and halides of groups 13-16, hydrides of boron-diborane and borazine. Chemistry of

fullerenes, carbides, fluorocarbons, silicates (structural principle), tetra sulphur tetranitride, basic properties of halogens and interhalogens.

**(c) Chemistry of Noble Gases**

**06 Hrs.**

Chemical properties of the noble gases, chemistry of xenon, structure and bonding in xenon compounds (oxides and fluorides).

**Unit-IV**

**(a) Acids and Bases**

**12 Hrs.**

Arrhenius, Bronsted Lowry, the Lux Flood, solvent system and Lewis concepts of acids and bases.

Hard and Soft Acids and Bases (HSAB): Classification of acids and bases as hard and soft. Pearson's HSAB concept, acid base strength and hardness and softness, symbiosis, theoretical basis of hardness and softness, electronegativity and hardness and softness.

**(b) Non- aqueous Solvents**

**06Hrs**

Physical properties of a solvent, types of solvents and their general characteristics, reactions in non-aqueous solvents with reference to liquid  $\text{NH}_3$  and liquid  $\text{SO}_2$ .

**Unit-V**

**(a) Oxidation and Reduction**

**12 Hrs.** Use of redox

potential data- analysis of redox cycle, redox stability in water, Latimer diagrams for oxygen, nitrogen, manganese, copper (acidic medium,  $\text{pH} = 0$ ) and for chlorine (acidic/ alkaline medium). Calculation of  $E^\circ$  values for skip- step couples using EMF diagrams. Frost diagrams for oxygen and nitrogen, Pourbaix diagrams for iron species in natural waters.

**(b) Silicones and Phosphazenes**

**06 Hrs.**

Silicones and phosphazenes as example of Inorganic polymers, nature of bonding in phosphazenes.

**Note for Paper Setting**

The question paper will contain two questions from each unit (total ten questions) and the candidates will be required to answer one question from each unit (total questions to be attempted will be five). There will be internal choice within each unit. The paper shall be of three hours duration.

**BOOKS RECOMENDED**

1. Basic Inorganic Chemistry, F.A.Cotton, G.Wilkinson and P.L. Gaus, Wiley.
2. Concise Inorganic Chemistry, J.D.Lee, ELBS.
3. Concepts of Models of Inorganic Chemistry, B.Douglas, S. McDaniel and J. Alexander, John Wiley.
4. Inorganic Chemistry, D.E.Shriver, P.W.Atkins and C.H.Langford, Oxford.
5. Inorganic Chemistry, W.W. Porterfield, Addison-Wesley.
6. Inorganic Chemistry, A.G. Sharpe, ELBS.
7. Inorganic Chemistry, G.L Miessler and D.A. Tarr, Prentice Hall

**Title: Laboratory Course-01 (Inorganic)**

**Maximum Marks: 50**

**Section-I:** Preparation of standard solutions Dilution -0.1M to 0.001M solutions (NaOH,Oxalic acid,  $\text{KMnO}_4$ ,  $\text{K}_2\text{Cr}_2\text{O}_7$ ). **06 Marks**

**Section-II:** Quantitative Analysis (Volumetric Analysis) **06 Marks**

- (a) Determination of acetic acid in Commercial vinegar using NaOH.
- (b) Estimation of calcium content in Chalk as calcium oxalate by permanganometry.
- (c) Estimation of ferrous and ferric ions by dichromate method.
- (d) Estimation of hardness of water by EDTA.
- (e) Estimation of copper using thiosulphate.

**Section-III: Qualitative Inorganic Analysis** **08 Marks**

Semi micro Analysis of salt mixtures containing three acidic and three basic radicals

**Section-IV: Viva /Note Book** **05 Marks**

**Note:-** There shall be three exercises in the examination, one from each section as per marks indicated against the each section.

**BOOKS RECOMENDED**

1. Vogel's Qualitative Inorganic Analysis revised, Svehla, Orient Longman.
2. Vogel's Textbook of Quantative Inorganic Analysis, revised, Svehla, Orient Longman.
3. Vogel's Textbook of Quantative Inorganic Analysis (revised), J.Bassett, R.C.Denney, G.H.Jeffery and J.Mendham, ELBS.
4. Experimental Inorganic Chemistry, W.G.Palmer, Cambridge.

# **Semester-II**

Title: **Physical Chemistry - I**  
Maximum Marks: **100**

## **Unit I**

**16 hours**

### **(a) Mathematical concepts**

Differentiation of functions like  $e^x$ ,  $x^n$ ,  $\sin x$ ,  $\cos x$ ,  $\log x$ ; Maxima and Minima, Partial differentiation and Euler's reciprocity relations, Integration of some useful/relevant functions; Factorials, Theorems of Probability.

### **(b) Solutions and Colligative properties**

Ideal and non-ideal solutions, Methods of expressing concentration of solutions, Activity and activity coefficient. Dilute solution, Colligative properties, Raoult's law, Relative lowering of vapour pressure, Molecular weight determination. Osmosis and osmotic pressure and its measurement, Determination of molecular weight from osmotic pressure, Elevation of boiling point and Depression of freezing point.

Abnormal molar mass, Degree of dissociation and association of solutes.

## **Unit II**

**18 hours**

### **(a) Gaseous State**

Postulates of kinetic theory of gases, Deviations from ideal behaviour, van der Waals equation of state.

**Molecular Velocities:** Root mean square, average and most probable velocities, Qualitative discussion of the Maxwell's distribution of molecular velocities, Collision number, Mean free path and Collision diameter, Liquefaction of gases, Linde's method and Claude's method.

**Critical Phenomena:** PV isotherms of real gases, Continuity of states, Isotherms of van der Waals equation, Relationship between critical constants and van der Waals constants, Law of corresponding states, Reduced equation of state, Numericals.

### **(b) Solid State**

Definition of space lattice, unit cell.

Laws of crystallography: Law of constancy of interfacial angles, Law of rationality of indices, Law of symmetry, Symmetry elements in crystals.

X-ray diffraction by crystals, Derivation of Bragg's equation, Determination of crystal structure of NaCl and KCl (Laue's method and Powder method), perfect and imperfect crystals, Frankel and Schottky defects.



### **Unit III**

**18 hours**

#### **Thermodynamics-I**

Definition of thermodynamic terms: System, Surroundings, etc., Types of systems, Intensive and extensive properties, State and path functions and their differentials, Thermodynamic process, Concept of heat and work.

**First law of thermodynamics:** Statement, Definition of internal energy and enthalpy, Heat capacity, Heat capacities at constant volume and pressure and their relationship, Joule's law, Joule-Thomson coefficient and inversion temperature, Calculation of  $w$ ,  $q$ ,  $dU$  and  $dH$  for the expansion of ideal gases under isothermal and adiabatic conditions for reversible process, Application to cyclic process (The Carnot Theorem), Carnot cycle and its efficiency.

**Thermochemistry:** Standard state, Standard enthalpy of formation, Hess's law of constant heat summation and its applications, Heat of reaction at constant pressure and at constant volume, Enthalpy of neutralization, Bond dissociation energy and its calculation from thermo-chemical data, Temperature dependence of enthalpy, Kirchhoff's equation, Numericals.

### **Unit IV**

**20 hours**

#### **Thermodynamics –II**

Second law of thermodynamics, Need for the law, Different statements of the law, Concept of entropy, Mathematical treatment of entropy concept, Combined form of the first and second laws of thermodynamics, Entropy as a state function, Entropy as function of  $V$  and  $T$ , Entropy as function of  $P$  and  $T$ , Entropy change in ideal gases and mixing of gases, Calculation of entropy changes of physical processes (Phase changes, Reversible isothermal expansion of ideal gas, Heating or cooling of substance, Reversible adiabatic change), Numerical.

#### **Thermodynamics –III**

Third law of thermodynamics, Nernst heat theorem, Definition of third law, Evaluation of absolute entropy of solids, liquids and gases from heat capacity data, Residual entropy.

**Free energy functions:** Purpose of new functions, Helmholtz ( $A$ ) and Gibbs ( $G$ ) free energy function, Significance of  $A$  and  $G$ , Variation of  $A$  and  $G$  with  $P$ ,  $V$  and  $T$ ;  $A$  and  $G$  as criteria for thermodynamic Equilibrium and spontaneity.

Relation between  $A$  and  $G$ , Gibbs – Helmholtz equation and its application, Clausius-Clapeyron equation and its applications, Integrated form of Clausius-Clapeyron equation, Numerical.

## **Unit V**

**18 hours**

### **Chemical Kinetics**

Chemical Kinetics and its scope, Rate of reaction, Factors influencing the rate of reaction: concentration, temperature, pressure, solvent, light, catalyst and surface area.

Concentration dependence of rates, Mathematical characteristics of simple chemical reactions: zero order, first order, second order, pseudo order, half life and mean life period, Determination of the order of reaction: differentiation method, method of integration, method of half life period and isolation method, Radioactive decay as a first order phenomenon.

Effect of temperature on rate of reaction, Arrhenius equation, Concept of activation energy.

Parallel, Consecutive and Opposing reactions, Potential energy Surfaces

### **Note for Paper Setting**

The question paper will contain two questions from each unit (total ten questions) and the candidates will be required to answer one question from each unit (total questions to be attempted will be five). There will be internal choice within each unit. The paper shall be of three hours duration.

### **Books Recommended:**

1. Mathematics for Chemists by Bhupendra singh, Pragati Prakashan.
2. An introduction to Chemical Thermodynamics by R. P. Rastogi and R. R. Misra, Vikas Publishing Co. Limited.
3. Text Book of Physical Chemistry by S. Glasstone, MacMillan India limited.
4. A Text Book of Physical Chemistry by K. L. Kapoor (Volumes 1 to 4), MacMillan India limited.
5. Chemical Kinetics by K. Laidler, Tata McGraw Hill Publishing Co. Limited.
6. Principles of Physical Chemistry by Maron and Prutton, Oxford and IBH Publishing Co. Pvt. Limited.

## **Semester-II**

Title: **Laboratory Course-01 (Physical)**

Maximum Marks: **50**

### **Section-I: Chemical Kinetics**

**07 Marks**

1. To determine the specific reaction rate of the hydrolysis of methyl acetate/ethyl acetate catalyzed by hydrogen ions at room temperature.
2. To study the effect of acid strength on the hydrolysis of an ester.
3. To compare the strength of HCl and H<sub>2</sub>SO<sub>4</sub> by studying the Kinetics of hydrolysis of ethyl acetate.

#### **(b) Distribution law**

1. To study the distribution of benzoic acid between benzene and water.
2. To study the distribution of iodine between carbon tetrachloride and water.

### **Section II: Colloids**

**07 Marks**

To prepare arsenious sulphide sol and compare the precipitating power of mono-, bi- and trivalent anions.

#### **(b) Viscosity and Surface Tension**

1. To determine the percentage composition of a given mixture (non interacting systems) by viscosity method.
2. To determine the viscosity of amyl alcohol in water at different concentrations and calculate the excess viscosity of these solutions.
3. To determine the percentage composition of a given binary mixture by surface tension method (acetone & ethyl methyl Ketone).
4. To determine the density of the liquid.

### **Section III:**

**06 Marks**

- (a) To determine the transition temperature by thermometric/dilatometric method.
- (b) To study the effect of a solute on the critical solution temperature of two partially miscible liquids (e.g., Phenol-Water system) and to determine the concentration of that solute in the given Phenol-Water system.
- (c) To determine the solubility of given inorganic salt (KCl, NaCl, KNO<sub>3</sub>, NaNO<sub>3</sub> & NaSO<sub>4</sub>) at different temperatures and obtain the solubility curves.

### **Viva Voce**

**05 Marks**

**Note:-** There shall be three exercises in the examination, one from each section as per marks indicated against the each section.

### **Books Recommended:**

1. Advanced Practical Physical Chemistry by J. B. Yadav, Goel Publications, Meerut.
2. Advanced Practical Chemistry by J. Singh, L.D.S. Yadav and J. Srivastava, Pragati Parkashan
3. Practical Physical Chemistry by B. Viswanathan and P.S. Raghavan, Viva Books Pvt. Ltd.

# Physics

# Semester-I

**Duration: 3 hours**

**End Semester Examination: 80 marks**

**Internal Examination: 20 marks**

*The question paper shall be of 80 marks. There shall be 10 questions in the paper with two from each unit. Each question shall be of 16 marks. The students have to attempt 5 questions selecting one from each unit.*

## **UNIT –I: Mechanics- I**

Unit vectors, displacement, area element, volume element, velocity and acceleration in Cartesian, Spherical polar and cylindrical coordinate system.

Inertial and non inertial frames of references, uniformly rotating frame; Coriolis force and centrifugal force, effect of centrifugal force due to rotation of the earth and coriolis force acting on a freely falling body, Geographical effects of coriolis force (qualitative)

## **UNIT-II: Mechanics –II**

Two body system; laboratory and centre of mass system, relationship between displacements, velocities, kinetic energies and angles in lab and centre of mass system.

Inverse square law of force: Concept of central and non- central forces, equivalent one body problem. Angular momentum conservation in a central force field, Energy of reduced mass & its conservation, differential equation of orbit in a central force field, Turning points of motion, relation between eccentricity and energy, Kepler's laws & Satellite motion.

## **UNIT-III: Oscillation -I**

Differential equation and its solution, energy of simple harmonic oscillator, examples: Compound pendulum, torsional pendulum, bifilar oscillations, Helmholtz resonator, LC circuit, Oscillation of two masses connected by a spring.

Nature of damping force, Damped simple harmonic oscillator, Differential equation and its solution, energy power dissipation, logarithmic decrement, relaxation time, quality factor, resistance and electromagnetic damping. Example of damping in physical systems, resistance damping, oscillatory discharge of a capacitor through circuit containing resistance and inductance, electromagnetic damping in a moving coil galvanometer.

## **UNIT-IV: Oscillation –II**

Driven harmonic oscillator, transient and steady state behaviour , solution of differential equation, velocity of the mechanical forced oscillator in the steady state, behaviour of displacement with driving force frequency , behaviour of velocity versus driving force frequency, power absorption and power dissipation, Sharpness of resonance, Quality factor, Electrical resonance.

## **UNIT-V: Theory of Relativity**

Galilean transformations and conservation laws: conservation of momentum and energy. Search for ether and Michelson-Morley experiment.

Postulates of special theory of relativity, Lorentz transformations, Consequences of Lorentz transformations, Length contraction, time dilation, experimental evidence in support of time dilation, twin paradox, simultaneity of events, velocity theorem, variation of mass with velocity, mass energy equivalence, energy-momentum relation, Illustrative examples in support of mass-energy equivalence, transformation relations between momentum and energy, particle with a zero rest mass, Doppler effect.

## **Hint for examiners/paper setters**

There will be two questions from each unit in the question paper. The students should attempt one question from each unit. In question paper, short answer type questions/numerical problems up to a maximum of 24 marks will be included. The weightage to short answer type questions and numerical problems should spread over all units.

## **Text & Reference Books**

1. Mechanics by Hans and Puri.
2. Mechanics by Sikri.
3. Mechanics by D.S. Mathur
4. Classical Mechanics by Kumar and Gupta.
5. Classical Mechanics by Goldstien.
6. Waves and Vibrations by S.P. Puri.
7. Waves and oscillation by Brij Lal and Subramanum.
8. Waves and oscillation by A.P. French.
9. Waves and oscillation by S.L. Kakani.
10. Theory of Relativity by R. Resnick.
11. Theory of Relativity by French.
12. Theory of Relativity by Patharia.

## **Practical**

**End Semester Examination: 25 marks**

**Internal Examination: 25 marks**

1. To find the value of 'g' by bar pendulum.
2. To find the surface tension of water by Jaeger's Method.
3. To find Moment of Inertia of Fly-Wheel.
4. To find the Young Modulus by bending beam Method.
5. To find rigidity of wire by Maxwell needle.
6. Bifilar Oscillator.
7. To find the frequency by Sonometer.

### **Reference Books**

1. B. Sc Practical Physics by C. L. Arora.
2. Practical Physics by G L Squires Cambridge University Press
3. Advanced Practical Physics for Students by Worsnop and Flint
4. Practical Physics by R K Shukla
5. B.Sc Practical Physics by Harnam Singh

**Note: The candidates are required to complete at least 5 practicals.**

## Semester-II

### USPHTC201

Theory

4 Credits (4-0-0)

Duration: 3 hours

External Examination: 80 marks

Internal Examination: 20 marks

*The question paper shall be of 80 marks. There shall be 10 questions in the paper with two from each unit. Each question shall be of 16 marks. The students have to attempt 5 questions selecting one from each unit.*

#### Unit-I

#### VECTOR CALCULUS

Basic ideas of vector algebra, Scalar and vector fields, Gradient of a scalar field and its physical interpretation, Line, surface and volume integrals, Divergence of a vector field and its physical significance, Solenoidal field, Gauss's divergence theorem.

Curl of a vector field and its physical significance, Stokes' theorem, Irrotational vector field, Vector identities.

#### Unit- II

#### ELECTROSTATICS

Gauss's law in integral and differential forms, Line integral of electrostatic field, Conservative nature of electrostatic field, Electric field as the negative gradient of potential, Poisson's and Laplace's equations.

Electric quadrupole, Electric field and potential due to quadrupole, Energy of electrostatic field.

Dielectrics, Polar and non-polar molecules, Polarisation of dielectric, Polarisation vector  $\vec{P}$ , Displacement vector  $\vec{D}$ , Relation  $\vec{D} = \epsilon_0 \vec{E} + \vec{P}$ , Atomic polarizability, Electric susceptibility, Relation  $K = 1 + \chi_e$ , Gauss's law in a dielectric medium (differential and integral forms), Energy in the dielectric system, boundary conditions satisfied by  $\vec{E}$  and  $\vec{D}$  at the interface between two homogeneous dielectrics.

#### Unit-III

#### ELECTRIC CURRENT AND MAGNETOSTATICS

Current and current density, Equation of continuity, Electrical conductivity, Microscopic form of Ohm's law, Failure of Ohm's law



Review of Biot-Savart's law, Ampere's circuit law ( integral and differential forms) and its limitations, Modified form of Ampere's Circuit Law, Displacement current, Divergence of magnetic field, Magnetic scalar and vector potentials, Divergence of vector potential, Derivation of Biot-Savart's law from vector potential.

Current loop as a magnetic dipole, Relation between magnetic dipole moment and angular momentum, magnetization vector  $\vec{M}$ , Magnetisation current, Free and bound currents, Relation

between  $\vec{B}$ ,  $\vec{H}$  and  $\vec{M}$ , Magnetic susceptibility and permeability, Boundary conditions satisfied by  $\vec{B}$  and  $\vec{H}$  at the interface between two media

## **UNIT- IV**

### **TIME VARYING FIELDS**

Integral and differential forms of Faraday's laws of electromagnetic induction, Self inductance of a solenoid, Mutual inductance of two solenoids, Self inductance and mutual inductance of current loops, Reciprocity theorem of mutual inductance, Relation between self and mutual inductances, Coefficient of coupling.

Energy stored in a magnetic field, Maxwell's equations (differential and integral forms) and their interpretation, Poynting vector, Poynting theorem and its differential form.

## **UNIT-V**

### **ELECTROMAGNETIC WAVES**

Electromagnetic waves in vacuum: The wave equations for  $\vec{E}$  and  $\vec{B}$ , Monochromatic plane electromagnetic waves and their transverse nature, Characteristic impedance.

Electromagnetic waves in dielectric medium: Propagation in linear media, Reflection and transmission at normal and oblique incidence, Derivation of laws of reflection and refraction.

Electromagnetic waves in conductors: Modified wave equations, Skin Depth, and Characteristic impedance.

### **Note for paper setters:**

There will be two questions from each unit in the question paper. The students should attempt one question from each unit. In question paper, short answer type questions/numerical problems up to a maximum of 24 marks will be included.

**Text and Reference Books:**

1. Vectors by Speigal
2. Electromagnetics by B.B. Laud
3. Electricity and Magnetism by K.K. Tiwari
4. Electricity, Magnetism and E. M. waves by K.K. Sharma
5. Introduction to Electrodynamics by David J. Griffiths
6. Electricity and Magnetism by A. E. Kip
7. Electricity and Magnetism by D. C. Tayal
8. Electricity and Magnetism by Reitz and Millford
9. Electricity and Magnetism by AK. Sikri

## **USPHPC202**

### **Practical**

**2 Credits (0-0-3)**

**External Examination: 25 marks**

**Internal Examination: 25 marks**

1. To find Capacity of a Capacitor by Electrical vibrator.
2. To find frequency of AC supply by Electrical vibrator.
3. To find the variation of Magnetic field with distance.
4. To find the Impedance of series LCR circuit.
5. To find low resistance by Carey Foster Bridge (Calibrating/without calibrating).
6. Compare the capacitance by De-Surety's Method.
7. Find Horizontal component of Earth's magnetic field by using vibration and deflection magnetometer.

### **Reference Books**

1. B. Sc Practical Physics by C. L. Arora.
2. Practical Physics by G L Squires Cambridge University Press
3. Advanced Practical Physics for Students by Worsnop and Flint
4. Practical Physics by R K Shukla
5. B.Sc Practical Physics by Harnam Singh

**Note: The candidates are required to complete at least 5 practicals.**

# Geology

# Semester –I

There shall be one theory paper of 100 marks (80 marks written external examination and 20 marks internal assessment) and one practical paper of 50 marks (internal examination). Theory paper shall be of three hours duration and the practical paper shall be of four hours duration. In case of regular students, internal assessment received from the colleges will be added to the marks obtained by them in the University examination and in case of private candidates, marks obtained by them in the University examination shall be increased proportionately in accordance with the relevant Statues / Regulations of the university.

## Basic Concepts of Geology

### UNIT-1

- 1.1 Origin of Earth: Kant-Laplace, Jeans and Jeffrey's, Big Bang Theories
- 1.2 Geochronology and its application in Geology, Radioactive dating Methods: K-Ar, C-14 and U-Pb methods.
- 1.3 Earthquakes: Earthquake belts of the world, seismic zones of India. earthquake predictions
- 1.4 Volcanoes: Classification of volcanoes, volcanic landforms and distribution of volcanoes
- 1.5 Weathering: Controlling factors of weathering, Types of weathering. Karst topography: Erosional and depositional features of Karst topography.

### UNIT-2

- 2.1 Fluvial Process: River profile, Stream types, Drainage pattern, erosional and depositional features produced by river.
- 2.2 Aeolian process: Processes of Aeolian erosion, erosional and depositional features produced by wind.
- 2.3 Glaciers: Their types, erosional and depositional features produced by glaciers, glaciations through geological ages.
- 2.4 Unconformities: Formation, types and recognition in the field.
- 2.5 Folds and faults: Morphology and Classification.

### UNIT-3

- 3.1 Minerals: classification of silicate minerals based on silicate structure.
- 3.2 The significance of physical properties and their utility in identification of minerals, MOhs scale of hardness.
- 3.3 Physical properties and chemical composition of Feldspar and Mica Groups.
- 3.4 Physical properties and chemical composition of Amphibole and Pyroxene Groups.
- 3.5 Physical properties and chemical composition of Garnet and Olivine Groups.

## **UNIT-4**

- 4.1 Crystal structure, morphology of crystals division of different crystals into normal crystal systems
- 4.2 Crystallographic axes and axial angles, notation of faces on parameters of Weiss and Miller indices.
- 4.3 Crystal Symmetry and forms of Normal classes of Cubic, tetragonal and Hexagonal Systems
- 4.4 Crystal Symmetry and forms of Normal classes of Orthorhombic, Monoclinic and Triclinic systems
- 4.5 Twinning: Twin crystals, Twin axis, twin planes, composition planes, Twin laws and different types of twinning

## **UNIT-5**

- 5.1 Petrological microscope: construction and working.
- 5.2 Polarized light, Pleochroism, Birefringence, Interference colours.
- 5.3 Extinction and its types, extinction angle, isotropism and anisotropism
- 5.4 Reflection, double refraction, Nicol prism and its construction and function.
- 5.5 Refraction. Refractive index: methods of its determination, critical angle.

### **Note for Paper setting:**

The question paper will contain two questions from each unit (Total ten Questions) and the examinees will be required to answer any five questions selecting one question from each unit.

### **Books recommended**

- |                           |                                      |
|---------------------------|--------------------------------------|
| 1. A. Holmes              | -Principles of Physical Geology      |
| 2. Thornburry             | -Geomorphology                       |
| 3. Deer, Hawie & Zuessman | -Rock forming minerals               |
| 4. Bagley, P.C            | -Structure and Tectonics             |
| 5. Gosh, S.K              | -Structural Geology                  |
| 6. Dana, E.S              | -A text book of mineralogy           |
| 7. Kerr, P.G              | -Optical mineralogy                  |
| 8. Condie                 | -Plate tectonics & crustal evolution |

### **Practicals**

- 1. Study of physical properties and chemical composition of rock forming minerals.
- 2. Study of optical properties of silicate minerals under microscope: Quartz, albite, microcline, orthoclase, muscovite, biotite, tourmaline, hornblende, augite, olivine.
- 3. Study of symmetry elements and forms of normal classes of crystal systems.
- 4. Viva-voce.

## **Semester –II**

There shall be one theory paper of 100 marks (80 marks written external examination and 20 marks internal assessment) and one practical paper of 50 marks (internal examination). Theory paper shall be of three hours duration and the practical paper shall be of four hours duration. In case of regular students, internal assessment received from the colleges will be added to the marks obtained by them in the University examination and in case of private candidates, marks obtained by them in the University examination shall be increased proportionately in accordance with the relevant Statues / Regulations of the university.

### **Basics of Petrology**

#### **UNIT-1**

- 1.1 Igneous rocks-definition, classification, tabular and normative.
- 1.2 Origin of igneous rocks, magmatic differentiation and assimilation.
- 1.3 Magma – definition and its composition, Bowen's reaction series.
- 1.4 Textures and structure of igneous rocks.
- 1.5 Description of important igneous rocks, i.e Granite, Rhyolite, Basalt, Gabbro, Syenite, Trachyte, Pegmatite and Peridotite.

#### **UNIT-2**

- 2.1 Felsic, femic, mafic and salic minerals, colour index and its significance.
- 2.2 Chemical composition of minerals and elementary idea about phase rule.
- 2.3 Use of phase rule in two and three component Silicate systems, crystallization of albite-anorthite, plagioclase series, di-ab- an system.
- 2.4 Mineralogical characteristics of acid and alkaline igneous rocks.
- 2.5 Mineralogical characteristics of basic and ultramafic igneous rocks.

#### **UNIT-3**

- 3.1 Sedimentary rocks- origin, transportation and deposition.
- 3.2 Diagenesis: lithification, compaction, cementation, neomorphism
- 3.3 Classification of clastic rocks.
- 3.4 Classification of non –clastic rocks
- 3.5 Primary and secondary structures in sedimentary rocks

#### **UNIT-4**

- 4.1 Textures of sedimentary rocks.
- 4.2 Structures of Sedimentary rocks.
- 4.3 Concept of Sedimentary facies.
- 4.4 Depositional environments of sedimentary rocks.
- 4.5 Description of important sedimentary rocks i.e. sandstone, shale, limestone, conglomerate and breccia.

## **UNIT-5**

- 5.1 Metamorphism, agents and types.
- 5.2 Textures and structures of metamorphic rocks.
- 5.3 Concept of ACF & AKF diagrams.
- 5.4 Metamorphic facies- greenstone, granulite and eclogite facies.
- 5.5 Description of important metamorphic rocks (Slate, Phyllite, Schist, Gneiss, Quartzite and marble).

### **Note for Paper setting**

The question paper will contain two questions from each unit (Total ten Questions) and the examinees will be required to answer any five questions selecting one question from each unit.

### **Books recommended**

- |                                  |  |
|----------------------------------|--|
| 1. H.H.Reed                      | -Rutley's Mineralogy                   |
| 2. Tyrrel                        | -Principles of Petrology               |
| 3. Deer, Hawie & Zuessman        | -Rock forming Minerals                 |
| 4. Myron,G                       | -Igneous & Metamorphic Petrology       |
| 5. Turner                        | -Metamorphic Petrology                 |
| 6. Dana, E.S                     | -A text book of mineralogy             |
| 7. Wilson                        | -Carbonate Rocks in Geologic History   |
| 8. Petijohn                      | -Sedimentary Rocks                     |
| 9. Reineck & Singh, I.B          | -Depositional Sedimentary Environments |
| 10. Friedman, Gorale & Sanders - | Principles of Sedimentology            |

### **Practicals**

- 1. Megascopic study of Igneous, metamorphic and sedimentary rock specimens.
- 2. Thin section study of common rock forming minerals
- 3. Field work and report (Compulsory)
- 4. Viva-voce.



**B.Sc.**

**Home Science**

# **Semester-I**

## **BASIC PHYSIOLOGY AND FUNDAMENTALS OF HUMAN NUTRITION**

**Course code:** USHSTC101  
**Duration of Examination:** 3hrs.

Max marks = 100  
External assessment =80  
Internal assessment = 20

**Syllabus for Examination to be held in the year 2014, 2015 & 2016**

*Recommended credits : 4 (4 hrs. per week)*

### **OBJECTIVES:**

The course is designed to enable students to

1. Understand the concept of physiology of human body
2. Obtain a better understanding of the principles of nutrition and dietetic through the study of physiology
3. Understand the concept of nutrition, various nutrients ,their requirements ,functions and deficiencies
4. Understand the vital relationship between nutrition and health.

### **Unit I**

- ❖ Cell structure and functions ,tissues, organs and organic systems
- ❖ Classification of tissues-epithelial, muscular, connective and nervous tissue and their distribution in the body.

### **Unit II**

- ❖ Blood-composition , functions, blood groups.
- ❖ Digestive system- structure, digestion, absorption and utilization

### **Unit III**

- ❖ Concept of nutrition ,relationship of nutrition to health, adequate nutrition and malnutrition, foods and its functions
- ❖ Energy-definition of calorie, BMR and factors affecting it, specific dynamic action of foods
- ❖ Concept of food groups and food exchange lists, factors affecting meal planning and importance of meal planning.

#### **Unit IV**

- ❖ Carbohydrates-classifications, functions, sources
- ❖ Protein- classification ,sources ,functions, mutual supplementation and deficiency diseases
- ❖ Lipids- classification ,sources ,functions

#### **Unit V**

- ❖ Vitamins- classification ,sources ,functions and deficiency
- ❖ Minerals-sources, functions, deficiency of iron, calcium, sodium, potassium and iodine.
- ❖ Water and electrolyte balance.

#### ***NOTE FOR PAPER SETTING:***

The Question paper will consist of two sections.

**Section I:** (12\*5=60) Consist of 10 long answer questions (2 from each unit, choice from within the unit). Each question carries weight age of 12 marks. The candidate will have to attempt five questions (at least one from each unit).

**Section II:** (4x5=20) Consist of 10 short answer question (2 from each unit). Each question carries weight age of 4 marks. The candidate will have to attempt any five questions.

#### **References:**

1. Acharya K.T. et.al.( 1981) Recommended dietary intakes for Indian. ICMR, Delhi,.
2. Anthony C.A.( 1963) Textbook of Anatomy and Physiology. The C.V Mossy Company, Saint-Louis .
3. Bell, G.H. Experimental Physiology Johnsmith and Sons. Limited Glassgow.
4. Best and Taylor N.B.( 1965) The living body Chapman and hall limited, London onwards.
5. Chaney M.S(1971) Nutrition, Houghton Preffin Company, Boston.
6. Gopalan C. Ramasastri, B.V. Balasnbmanian S.C (, 1981)Nutritive value of Indian Foods, NIN, Hyderabad.
7. Green J.M.( 1968 ) An introduction to human physiology, Oxford University Press, London.
8. Rajlakshmi R.Applied nutrition. Oxford IBM publishing company, New Delhi.
9. Robinson, C.H.Lawia M.R, Chenoweth and Garwich, A.E (1986) Normal and Therapeutic nutrition, Macmillan publishing company.

10. Svasmirdha M.S (1985). Essential of foods and nutrition. VI fundamentals aspects.

## **PRACTICALS**

**Course code:** USHSPC111

Duration of Examination: 3hrs

Max marks: 50

External Assessment: 25

Recommended credits: 2 (3 hrs per week)

Internal Assessment: 25

- ❖ Demonstration of Tissue slides under microscope.
- ❖ Blood Grouping, Hemoglobin Estimation.
- ❖ Study of weights and measures.
- ❖ Study of food sources of nutrients.
- ❖ Study of meal planning and factors affecting it.
- ❖ Planning and preparation of meals for iron deficiency anemia and protein – energy malnutrition.
- ❖ Planning and preparation of day's meal. Calculating nutrients in accordance to the RDA for adults.
- ❖ Planning and preparation of nutrient rich dishes
  - Energy
  - Protein
  - Carbohydrates
  - Vitamin A
  - Vitamin C
  - Thiamin
  - Calcium

## **FUNDAMENTALS OF FAMILY RESOURCE MANAGEMENT**

**Course code:** USHSTC102  
**Duration of Examination:** 3hrs

Max marks = 100  
External assessment =80  
Internal assessment = 20

### **Syllabus for Examination to be held in the year 2014, 2015 & 2016**

*Recommended credits : 4 (4 hrs. per week)*

#### **Objectives:**

1. To understand the fundamentals of resource management in a changing scenario.
2. To inculcate skills in identifying, creating, selecting and using available resources judiciously with emphasis on maximization and conservation.
3. To understand the scientific application of the process of management in the judicious use of resources
4. To gain knowledge with respect to the interior decoration.

#### **Unit –I: An overview of Management Concepts**

- ❖ Meaning of management
- ❖ Purpose of Home management
- ❖ major home and family responsibilities
- ❖ home maker as manager
- ❖ Qualities of efficient home manager
- ❖ Misconception and obstacles to good management

#### **Unit –I I: Introduction to Resources**

- ❖ Meaning, definition, importance and characteristics of resources.
- ❖ classification of resources
- ❖ Factors affecting utilization of resources
- ❖ Maximizing use of resources
- ❖ Resource conservation – importance and methods.
- ❖ Availability of resource at self and family level.
- ❖ Major motivating factors-values, goals and standards.

#### **Unit –III: Management process**

- ❖ Decision making-definition,steps and types
- ❖ Mangement Process:
  - Planning
  - Supervising
  - Controlling
  - Organizing

- Evaluation
- ❖ Management of specific resources by an individual / family
  - Money
  - Time
  - Energy

#### **Unit – IV: Design fundamentals**

- ❖ Objectives of Art and Interior Design.
- ❖ Types of Design : Structural and Decorative
- ❖ Elements of content : Space, point, line, shape, form, texture, light and colour
- ❖ Colour and its application-
  - Dimensions of colour
  - Importance of colour and its role in creation of the design
  - Colour theories
  - Colour schemes
  - Characteristics of colour

#### **Unit –V: Principles of Design**

- ❖ Rhythm,
- ❖ Balance,
- ❖ Proportion,
- ❖ emphasis and
- ❖ Harmony
- ❖ Application of principles of design in
  - Flower arrangement
  - Furniture arrangement
  - Colour schemes

#### **NOTE FOR PAPER SETTING:**

The Question paper will consist of two sections.

**Section I:** (12\*5=60) Consist of 10 long answer questions (2 from each unit, choice from within the unit). Each question carries weight age of 12 marks. The candidate will have to attempt five questions (at least one from each unit).

**Section II:** (4\*5=20) Consist of 10 short answer question (2 from each unit). Each question carries weight age of 4 marks. The candidate will have to attempt any five questions.

## References

1. Koontz.H. and O'Donnel C., 2005, Management – A systems and contingency analysis of managerial functions. New York: McGraw-Hill Book Company
2. Kreitner. 2009, Management Theory and Applications, Cengage Learning: India
3. Nickell, P., & Dorsey, J.M.,(1962) Management in family living, , (4th Edition). New York NY: Wiley.
4. Rao V.S. and Narayana P.S., (2007,)Principles and Practices of Management, Konark Publishers Pvt. Ltd.
5. Stoner J., 2008, Management. PHI Learning.
6. Shukul M and Gandotra V.,2006,Home management and familyfinance,Dominant publishers and distributors ,New Delhi.



## **PRACTICALS**

**Course code:** USHSPC112

Duration of Examination: 3hrs

Max marks: 50

External Assessment: 25

Recommended credits: 2 (3 hrs per week)

Internal Assessment: 25

- ❖ Making and evaluation of one's own time plan
- ❖ Study of pathway chart of any one household activity
- ❖ Preparing structural and decorative design by showing various colour schemes
- ❖ Floor decorations by various techniques
- ❖ Preparation of different types of flower arrangement

## **FUNDAMENTALS OF CLOTHING CONSTRUCTION AND CARE**

**Course code:** USHSTC103

Max marks = 100

Duration of Examination: 3hrs

External assessment =80

Internal assessment = 20

### **Syllabus for Examination to be held in the year 2014, 2015 & 2016**

*Recommended credits: 4 (4 hrs. per week)*

#### **OBJECTIVES:**

1. To acquaint the students with terminology related to clothing.
2. To develop skills in clothing construction.
3. To familiarize the students with method and aids of laundry.
4. To enable intelligent selection, use and care of Textiles.
5. To acquaint them with basic embroidery stitches.

#### **Unit – I:Introduction to clothing construction**

- ❖ Importance & Functions of clothing.
- ❖ Clothing construction – introduction, terminology & principles
- ❖ Equipments & tools used for measuring, drafting, cutting & sewing machine.
- ❖ Sewing machine: Parts & functions, basic operations, defects and remedies, care and maintenance required.
- ❖ Basic sewing processes – stitches, seams, fastenings, openings, fullness, collars, sleeves, pockets.

#### **Unit - II: Preparation of fabric for layout and cutting**

- ❖ Importance of taking body measurements in relation to sizes.
- ❖ Taking body measurements for different types of garments.
- ❖ Drafting and paper patterns, preparation of fabrics for garment making,
- ❖ Laying out of patterns,-general guidelines, basic layouts-lengthwise, partial lengthwise, double fold, open and combination fold.
- ❖ Pinning ,marking and cutting
- ❖ Estimation of material required for different types of garments.

#### **Unit – III Introduction to embroidery**

- ❖ Fundamentals of embroidery – techniques, design, colour combination,
- ❖ Uses of different threads, different embroidery stitches.
- ❖ Study of various types of contemporary embroideries like shadow work, cut work, appliqué work and smoking.

#### **Unit – IV Laundry technology**

- ❖ Laundry aids – Laundry equipment, methods of laundry, principles of washing method and machine washing.
- ❖ Water – Hard and soft water, temporary and permanent hardness, methods of softening water.
- ❖ Soaps and detergents – Definition, manufacture, properties and their cleaning action.
- ❖ Bleaches, stain removal, whitening and stiffening agents / definition and types.

#### **Unit –V Selection of apparel**

- ❖ Selection according to age – Infants, pre-school, school going children, adolescent, adults and old age.
- ❖ Climate, occasion, occupation, fashion, figure and design.
- ❖ Factors affecting fitting
- ❖ Fit problems and remedies.

#### ***NOTE FOR PAPER SETTING:***

The Question paper will consist of two sections.

**Section I:** (12\*5=60) Consist of 10 long answer questions (2 from each unit, choice from within the unit). Each question carries weight age of 12 marks. The candidate will have to attempt five questions (at least one from each unit).

**Section II:** (4x5=20) Consist of 10 short answer question (2 from each unit). Each question carries weight age of 4 marks. The candidate will have to attempt any five questions.

#### **References:**

1. Bans , S Hutton,J, singer Sewing book, Hamlya, London, 1972.
2. Corbman, P.B textiles- Fibre to fabric ( 6<sup>th</sup> edition ) MC Graw Hill book Co. 1983.
3. Creative embroidery designs- Ondorisha Publications.
4. Dulkar, Durga Household textiles and laundry work, Delhi,1983.
5. Doogagi- Basic processes and clothing construction, New Delhi, Raj Book depot, 1975.
6. Dhantyagi, S, Fundaments of textiles and their care, orient Long man, Bombay, 1974.
7. Hall. A.J , the standard handbook of textiles, National trade press,1946.
8. Jaffe. H. Children wear Design, fair child publication New York 1989.
9. Marry Kefgan and personal appearance- A guide for sonsumer, 4<sup>th</sup> Mac Millan Publishing co. New York. 1971. Mac Millan, London.
10. Needle craft by Readers digest.

11. Rayan S.M – a study of Human behavior, Mac Millan Com. New York.
12. Weber, J. Clothing- Fashion, Fabric, construction, Benne and M. knight Publishing company, 1986.

## **PRACTICALS**

**Course code : USHSPC113**

Duration of Examination: 3hrs

Max marks: 50

External Assessment: 25

Recommended credits: 2 (3 hrs. per week)

Internal Assessment: 25

❖ Basic sewing processes:

- Stitches: tacking, hemming.
- Seams-Plain, lapped, French, counter, flat and fell.
- Fastenings,
- plackets-one and two piece ,
- fullness-tucks and pleats,
- collars-peter pan ,cape,
- sleeves-plain and puff,
- pockets-patch.

❖ Basic embroidery:

stem, chain, lazy daisy, fly, satin, long and short ,herringbone, blanket ,button hole, French knot ,bullion stitch ,feather, cut work, shadow work, smoking.

❖ Drafts:

- Childs bodice block.
- Adaptation of Childs bodice block for making any one garment.

## **Semester-II**

### **FOUNDATIONS OF HUMAN DEVELOPMENT AND FAMILY DYNAMICS**

**Course code:** USHSTC204

Max marks = 100

Duration of Examination: 3hrs

External assessment =80

Internal assessment = 20

#### **Syllabus for Examination to be held in the year 2015, 2016 & 2017**

*Recommended credits : 4(4hrs. per week)*

##### **Objectives:**

1. To introduce the students of the field of Human Development: Concepts, Scope and Historical Perspectives.
2. To introduce the students to the dimension of Development over the life span
3. Acquire knowledge and insights about the dynamics of development of contemporary marriage and family system in India.
4. Became acquainted with the concept, goals and areas of adjustment in marital relationships with the family
5. Become aware of the changing roles and relationships within the family.
6. Understand the dynamics of families in distress and crises.

##### **Unit-I**

###### **❖ Child development**

- Importance and scope of child development
- Various methods of child study: Observation and interview (in detail)

###### **❖ Human development**

- Meaning, Importance and Scope of Human Development

##### **Unit II**

###### **❖ Orientation to Growth and Development**

- Principles and factors influencing growth and development
- Pre-natal development
- Conception and fertilization
- Stages in pre-natal development
- Birth process

- Anti natal care

### **Unit III**

#### **❖ Development of Physical and Motor Abilities across the life span**

- Physical Appearance of the new born -size, weight, bodily proportion, sensory capacities.
- Physical development in infancy, Pre -school, middle childhood and adolescence
- Motor Development: reflexes in infancy, major milestones in preschool years, middle and late childhood and adolescence, plateau in adulthood, declining coordination in middle adulthood and old age.

#### **❖ Cognitive Development**

- A brief introduction to Piaget's theory stages.
- Cognitive development during adulthood, decline in old age.

### **Unit IV**

#### **❖ The development of language across the life span:**

- Language as form of communication, early vocalization.
- Beginning to use language
- Language as refined through middle, late childhood and puberty.

#### **❖ Socio-Emotional Development across the life span:**

- Social milestones
- Acquiring sex role in childhood
- Emotional confusion and adolescence
- Stability of emotions in adulthood and old age .

### **Unit V**

#### **❖ The Family and Marriage**

- Definition and Types of families
- Functions of the Family
- Family life cycle
- Definition and Types of marriages

- Mate selection and its factors

❖ **Socialization:**

- Meaning of socialization
- Functions of the family and community in the socialization of the child
- Agents of socialization- family, neighbour, press and media

***NOTE FOR PAPER SETTING:***

The Question paper will consist of two sections.

**Section I:** (12\*5=60) Consist of 10 long answer questions (2 from each unit, choice from within the unit). Each question carries weight age of 12 marks. The candidate will have to attempt five questions (at least one from each unit).

**Section II:** (4x5=20) Consist of 10 short answer question (2 from each unit). Each question carries weight age of 4 marks. The candidate will have to attempt any five questions.

**References:**

1. Rice, F.P. (1988). Human development Prentice Hall
2. Berk, Laura (1993). Infant children and adolescents. Allyn and Bacow.
3. Binger, J.J. (1994). Individual and family development; A life span interdisciplinary approach, Prentice Hall
4. Sharma, Arti (2001). Indian Psyche of childhood, Global Vision Publishing House.
5. Kumar, R. (1998). Child Development in India Health, Welfare and management . Vol. I and II. Ashiah Publishing House.
6. Saraswati, T.S. and Kaur, B.(1993). Human development and Family Studies in India, New Delhi. Sage Publication.



## **PRACTICALS**

**Course code:** USHSPC214

**Duration of Examination:** 3hrs

**Max marks:** 50

**Recommended credits:** 2 (3 hrs. per week)

**External Assessment:** 25  
**Internal Assessment:** 25

- ❖ Observing infants in various settings i.e.
  - Anganwari/ Preschool
  - Home Setting
- ❖ Recording all-round development of children below 12.
- ❖ To study the changes (personal and social) in adolescents.
- ❖ Interviewing adults with regards to their role in the family.
- ❖ Visit to a day care centre to study its programme and activities.
- ❖ Survey of welfare agencies working for the welfare of families.
- ❖ Interaction with the aged to study their activities and problems.
- ❖ Lecture by a counselor to study the process of counseling.
- ❖ Observation of motor and cognitive development of infants.
- ❖ Survey of existing marriage pattern in local context.

## **FUNDAMENTALS OF COMMUNICATION AND EXTENSION**

**Course code:** USHSTC205

Max marks = 100

Duration of Examination: 3hrs

External assessment =80

Internal assessment = 20

### **Syllabus for Examination to be held in the year 2015, 2016 & 2017**

*Recommended credits : 4(4hrs. per week)*

#### **OBJECTIVES**

1. To understand the concept of communication and extension and its relevance for self and national development.
2. To appreciate the role of Home Science extension in community development.
3. To sensitise students towards identifying extension methods and prepare suitable materials for effective communication.
4. Understand the socio-economic structures and systems that make up the rural and urban communities.

#### **Unit I- Basics of Communication**

- ❖ Concept, nature, function and Scope of Communication.
- ❖ Postulates of Communication.
- ❖ Principles of Communication.
- ❖ Elements of Communication process and their characteristics Communication, Message, Channel, Audience, Feedback.

#### **Unit II- Models of Communication**

- ❖ Concept and Purpose of Models.
- ❖ Aristotle's Model.
- ❖ Wilkeer Schramm Model
- ❖ Gerbuer's Model.

#### **Unit III- Basics of Extension**

- ❖ History and Philosophy of Extension.
- ❖ Concept, objectives and Scope of Extension.
- ❖ Principles of Extension.
- ❖ Functions of Extension.
- ❖ Qualities of an Extension Worker.

#### **Unit IV- Teaching - Learning Process in Extension**

- ❖ Concept.
- ❖ Criteria for Effective Extension Teaching.
- ❖ Effective teaching situation and its elements.
- ❖ Criteria for effective learning.

#### **Unit V- Facilitators in Communication and Extension Methods and Materials.**

- ❖ Relationship between Extension and Communication.
- ❖ Methods of Community Contact
  - Individual – Personal Visits, Letters, discussion
  - Group – Meeting, Discussions, Demonstration
  - Mass – Print and Electronic Media
- ❖ Role of Communication technologies in Extension.

#### ***NOTE FOR PAPER SETTING:***

The Question paper will consist of two sections.

**Section I:** (12\*5=60) Consist of 10 long answer questions (2 from each unit, choice from within the unit). Each question carries weight age of 12 marks. The candidate will have to attempt five questions (at least one from each unit).

**Section II:** (4x5=20) Consist of 10 short answer question (2 from each unit). Each question carries weight age of 4 marks. The candidate will have to attempt any five questions.

#### **References:**

1. Singh. A.K. 2000, Agricultural extension, Agrobias, Jodhpur, India.
2. Kumar, B. and Hansra, 2000; Extension Education for Human Resource Development, Concept Publishers, New Delhi.
3. Singh, Ranjit, 1987; Text Book of Extension Education, Sahitya Kala Prakashan, Ludhiana.
4. Supe, S.V. 1984; An introduction to extension education New Delh, Oxford and IBH.
5. Rolling. N. 1986; Extension Science; Information Systems in Agricultural Development, Edinburg, Cambridge University Press.
6. Ravindran, R.K. 1999; Media and Society. Commonwealth, New Delhi.

## **PRACTICALS**

**Course code:** USHSPC215

Duration of examination: 3hrs

Max marks: 50

External Assessment: 25

Recommended credits: 2 (3hrs. per week)

Internal Assessment: 25

- ❖ Planning, preparation presentation of audio-visual aids
  - Posters
  - Puppets
  - Pamphlets
  - Charts
  - leaflets
- ❖ Planning & Implementations of Discussion Method.
- ❖ Planning & Implementation of Personal Visits – to study socio-economic status of different rural/urban families.
- ❖ Participant observation of families for gender bias.

## **BASICS OF COMPUTER SCIENCE**

**Course code:** USHSTC206  
**Duration of Examination:** 3hrs

**Max marks = 100**  
**External assessment = 80**  
**Internal assessment = 20**

### **Syllabus for Examination to be held in the year 2015, 2016 & 2017**

*Recommended credits : 4(4 hrs. per week)*

#### **Objectives**

To enable the students to:

1. Know the basics of computers.
2. To be able to use computers for education, information.
3. Understand and use MS-Word and MS-Excel.
4. Create hyperlink between MS-Word and MS-Excel.

#### **Unit I: Using MS-Word**

- ❖ Creating and formatting a document, starting window, Elements of word window, Entering and Editing text Toolbars and their icons.
- ❖ Table creation and operations.
- ❖ Auto correct, Auto Text, Spell Check, Thesauruses.
- ❖ Word art, Inserting Objects.
- ❖ Mail-merge.
- ❖ Page set-up, page preview.
- ❖ Printing a document.

#### **Unit II: Using MS-Excel**

- ❖ Creating a work sheet, starting MS-Excels, selecting cells Toolbars and their icons.
- ❖ Sorting data, Auto sum.
- ❖ Use of functions.
- ❖ Naming cells and ranges.
- ❖ Generating graphs, chart.
- ❖ Creating hyperlink to WORD document.
- ❖ Printing worksheets.

#### **Unit III: MS-Excel**

- ❖ Starting MS-Excel
- ❖ Toolbars & their icons
- ❖ Selecting Cells
- ❖ Entering & Editing text
- ❖ Entering Numbers
- ❖ Entering cell contents

- ❖ Formulas
- ❖ Creating the charts

#### **Unit IVMS-PowerPoint**

- ❖ Starting PowerPoint
- ❖ Creating Power Point Presentation
- ❖ Editing Text on Slide
- ❖ Formatting Text
- ❖ Formatting Paragraphs
- ❖ Checking Text
- ❖ Using Clip Art Gallery
- ❖ Develop a Slide Show

#### **Unit V Internet**

- ❖ Computer Network (LAN, MAN, WAN)
- ❖ What is Internet?
- ❖ Use of Internet
- ❖ Software & Hardware requirements of Internet
- ❖ Search Engines & Search of a topic
- ❖ Advantages & Disadvantages
- ❖ Creation & use of E-mails

#### ***NOTE FOR PAPER SETTING:***

The Question paper will consist of two sections.

**Section I:** (12\*5=60) Consist of 10 long answer questions (2 from each unit, choice from within the unit). Each question carries weight age of 12 marks. The candidate will have to attempt five questions (at least one from each unit).

**Section II:** (4x5=20) Consist of 10 short answer question (2 from each unit). Each question carries weight age of 4 marks. The candidate will have to attempt any five questions.

#### **References:**

1. Anita Goel, (2001)**Fundamentals of Computers:** Forthcoming title in Pearson - Education
2. V Rajaraman,(2007)**Fundamentals of Computers,** Fourth Edition, PHI.

## **PRACTICALS**

**Course code:** USHSPC216

Duration of Examination: 3hrs

Max marks: 50

External Assessment: 25

Recommended credits: 2 (3hrs. per week)

Internal Assessment: 25

- ❖ Window
  - Starting & shutting Computer, Moving windows, Display Properties.
  - Exploring Disk, Files & Folders.
- ❖ MS-Word
  - Creating new word document, Open existing document, Save, Print, Page Setup, Close, Exit.
  - Edit, View, Insert, Format, Tools menus
- ❖ MS- Power Point
  - Starting presentation, Improving presentation, Create Presentation using Auto Content Wizard & Using power point Templates, Copying Text, Moving Text, Deleting Text, Aligning Text in a Slide,
  - Changing fonts, Adding Symbols, Using Clip Art Gallery, Animate text and Graphic Object
- ❖ MS Excel
  - Printing & Saving sheets, Entering & Editing text, Page Setup
  - Edit, Insert, Format, Tools menus
- ❖ Internet
  - Opening web page
  - E-mail
  - Search Engines
  - Downloading files from Internet

# Electronics



# Semester-I

## USELTC101

**Title: Electronic Circuit Analysis  
Theory**

**4 Credits (4-0-0)**

**Duration: 3 hours**

**End Semester Examination: 80 marks**

**Internal Examination: 20 marks**

### **UNIT-I** *Network analysis*

Kirchoff's laws voltage and current sources; source transformations; mesh and nodal analysis; star delta transformations, network theorems: Thevenin's Norton's superposition, Millman, maximum power, and compensation.

### **UNIT-II** *A.C. circuit analysis*

Fundamentals: sinusoids, exponential functions, solution (exponential function real and imaginary parts); resonance: series and parallel resonance (BW, resonance condition, impedance variation, effect of resistance, and reactance curves); coupled circuits: mutual inductance, coefficient of coupling, ideal transformer, series connection of coupled circuit.

### **UNIT-III** *Analysis of R,L, C circuits*

Transient analysis of RC, RL, RLC circuits using differential equations; Laplace transform: transforms of linear combinations, transforms of derivatives & integrals, solution of problems using Laplace transform (partial fraction expansion and heavy side expansion theorem) : solution of series RL, RC, RLC circuits using Laplace transform.

### **UNIT-IV** *Two port Networks*

Introduction, two port Network parameters: Openckt.impedance, shortckt. Admittance, Transmission, Inverse Transmission, Hybrid and Inverse hybrid. Inter-relationship of Different parameters, T and  $\pi$  representation, lattice network, Image parameters.

### **UNIT-V** *Filters*

Fundamentals: neper, decibel, current & voltage ratios as exponentials; symmetrical networks: properties, propagation, and  $Z_0$  filter fundamentals: pass and stop bands, behavior of characteristic impedance, constant k low pass and high filters, m- derived T and  $\pi$  section filters; termination with m-derived half sections; band pass and band elimination filters; filter design.

**Note for paper setter**

*The question paper will contain three sections A, B & C. Section A will consist of ten very short answers type questions, two from each unit, carrying 2 marks each. All the questions in section A will be compulsory. Section B will consist of ten short answer type questions, two from each unit with internal choice. Student will be required to attempt any five questions, each question carrying 6 marks. Section C will have 5 long answer type questions one from each unit, carrying 10 marks. Student will be required to attempt any 3 questions.*

**References**

1. Sudhakar and Bhyam Mohan, **Network and Circuits: Analysis Synthesis**, Tata McGraw-Hill, New Delhi.
2. M.E. Van Valkenburg, Network Analysis, Prentice-Hall of India, New Delhi
3. Schaum's outline series, Electric Circuits, Tata McGraw Hill, New Delhi
4. T.F. Bogart Jr. Electric Circuits, Tata McGraw-Hill, New Delhi.

## **USELPC102**

**Title: Lab. Course in circuits and Networks**

**Practical**

**2 Credits (0-0-3)**

**End Semester Examination: 25 marks**

**Internal Examination: 25 marks**

**Note:** Each of the students has to perform a minimum of 06 experiments selecting at least one experiment from each of the following topics:

Set I: Network theorems

SetII: A.C.Circuits

SET III: Filters

# Semester-II

## USELTC201

**Title: Electronic Devices & Circuits**

**Theory**

**4 Credits (4-0-0)**

**Duration: 3 hours**

**External Examination: 80 marks**

**Internal Examination: 20 marks**

### UNIT-I *Electronic Components*

Resistors: fixed resistor (wire wound, film and composite), variable resistors (mechanically and thermally variable).

Capacitors: specifications, fixed capacitors (vacuum) gas filled, foil film, oil, mica, ceramic and electrolytic) variable capacitors (mechanical & voltage variable).

Inductors: specification, fixed inductors (air iron & ferrite cored)

Integrated circuit: Advantages, Disadvantages, Integration scale, classification of ICs. Introduction to fabrication of electronic components resistor, capacitor diode.

### UNIT-II *Semiconductor diodes*

PN-junction diode: static and dynamic resistances, equivalent circuits, transition and diffusion capacitances; diode load line analysis; rectifier's analysis: half wave, full wave, and bridge; clippers and clampers; Zener diode and its applications; construction, working and characteristics; of LED, Solar cell, Photo, Tunnel, Varactor diode & schottky diode.

### UNIT-III *Transistors*

BJT: biasing: fixed bias, collector feedback and voltage divider; stabilization and bias compensation; FET: construction and characteristics, Shockley equation, transfer curve, biasing (self and voltage divider); construction, working and characteristics of MOSFET, Phototransistor; and UJT.

### UNIT-IV *Amplifiers*

h-parameters and equivalent circuit; BJT small signal analysis for CE, CB, and CC: input impedance, current and voltage gains, and output impedance; cascading: RC coupled, TC, and DC amplifiers (circuit, analysis, and frequency response); Power amplifiers: class A, B, and C; class-B Push-pull amplifier.

### UNIT-V *Feedback and oscillator circuits*

Analysis of voltage series, voltage shunt, current series, and current shunt feedback configurations; effect of negative feedback; simple practical feedback circuits; Barkhausen criterion; analysis of phase shift, Wein bridge, Hartley, Colpitt's Clapp's and crystal oscillators.

**Note for paper setter**

*The question paper will contain three sections A, B & C. Section A will consist of ten very short answers type questions, two from each unit, carrying 2 marks each. All the questions in section A will be compulsory. Section B will consist of ten short answer type questions, two from each unit with internal choice. Student will be required to attempt any five questions, each question carrying 6 marks. Section C will have 5 long answer type questions one from each unit, carrying 10 marks. Student will be required to attempt any 3 questions.*

**References**

1. Robert Boyelstaf, **Electronic Devices and Circuit Theory**, Prentic-Hall of India, New Delhi
2. David A. Bell, **Electronic Devices and Circuits**, Prentic-Hall of India, New Delhi
3. Millman and Halkias, **Integrated Electronics**, Tata McGraw-Hill, New Delhi.
4. S.M. Sze, **Physics and Technology of Semiconductor Devices**, John-Wiley & Sons.

## **USELPC202**

**Title: Lab. Course in Electronic Devices**

**Practical**

**2 Credits (0-0-3)**

**External Examination: 25 marks**

**Internal Examination: 25 marks**

### **SEM-II**

**Note:** Each of the student has to perform a minimum of 06 experiments selecting at least one experiment from each of the following topics:

Set I: Rectifier & Device Characteristics

Set II: Amplifiers

SET III: oscillators