

NOTIFICATION

No. : 51/2015

Date: 18/06/2015

Subject : I) Continuation of Prospectus No.2014121 prescribed for B.Sc.Part-I for the Session 2015-16.
II) Introduction of new Syllabi for the subject Forensic Science at B.Sc. Part-I from the session 2015-16.
Reference : Notification No.11 of 2014, dated 23.1.2014.

- I) It is notified for general information of all concerned that the Prospectus of B.Sc.Part-I (Sem-I & II) bearing No.2014121 prescribed for the Academic Session 2014-15 shall continue for the session 2015-16 along with the following substitutions/additions.
- i) The syllabi of B.Sc.Part-I Sem-I ‘1S Mathematics, Paper I & Paper II’ printed on page Nos.13 to 16 and B.Sc.Part-I Sem-II ‘2S Mathematics, Paper III & Paper IV’ printed page Nos. 89 to 92 be substituted by the **Appendix-A & Appendix-B** respectively appended with this Notification.
 - ii) The existing practical syllabi of B.Sc.Part-I Sem-I “1S Zoology” and Sem-II “2S Zoology” prescribed vide Notification No.11 of 2014 dated 23.1.2014 be substituted by the practical syllabi given in **Appendix-C** appended with this Notification.
 - iii) The books be added as reference books as given in the following table.

Sr. No.	Name of the Book/Publisher	Name of Author	Book be added in the list of
1	A Text Book of Botany – Diversity of Microbes and Cryptogams (2013) published by Nabh Prakashan, Amravati	Dr.N.H.Shahare, Dr.A.U.Pachkhede, Dr.D.V.Hande, Dr.S.H.Kanherkar, Sh.R.S.Dhande Dr.D.S.Talwankar	Reference book for B.Sc.-I, Sem-I for the subject Botany on page no. 39 at sr.no. 29.
2	A Text Book of Botany – Paleobotany, Gymnosperms, Morphology and Utilization of Plants (2014) published by Nabh Prakashan, Amravati	Dr.P.W.Deotare, Dr.M.A.Shahezad, Dr.Mrs.U.G.Malode, Dr.U.S.Patil, Dr.Mrs.P.S.Kokate, Dr.Mrs.S.P.Khodke	Reference book for B.Sc.-I, Sem-II for the subject Botany on page no.120 at sr.no. 42.
3	Morphology of Angiosperms and Utilization of Plants	Dr.Shubhangi Ingole	Reference book for B.Sc.-I, Sem-II for the subject Botany on page no.120 at sr.no. 43.
4	Food & Nutrition, Himalaya Publishing House.	Nikhilesh Kulkarni, Mahendra Deshpande	Reference book for B.Sc. Sem-I & II for the subject Food Science on page no.163 at sr.no. 27.

- iv) The minor changes be made in the syllabi of B.Sc.Part-I Sem-II (2S Statistics) as given in the following table.

Sr. No.	Reference in the Prospectus	Changes in the Syllabi
1	2	3
1	B.Sc.Part-I Sem-II Prospectus No.2014121 Page No.143	I) In Unit-I, i) the Sr.Nos. 1.3, 1.4, 1.5 be shifted in Unit-II as Sr.Nos.2.1, 2.2, 2.3 resp. ii) the Sr.No. 1.6 be renumbered as 1.3. iii) the Sr.No. 1.4 be added as “1.4 Intraclass correlation coefficient.” II) In Unit-II, i) the present contents of Unit II, be deleted completely. ii) the title of new Unit II be read as “Regression Theory.” iii) the Sr.No. 2.4 be added as “2.4 Concept of Multiple regression, equation of plane of regression of three variables.” iv) the Sr.No. 2.5 be added as “2.5 Definition of Partial regression.”

- II) It is further notified for general information of all concerned that the authorities of the University have introduced the new subject “**Forensic Science**” at B.Sc. Part-I (Sem-I & II) from the session 2015-16 as “1S Forensic Science (Basics of Forensic Science)” and “2S Forensic Science (Forensic Chemistry)” as given in **Appendix-D** appended with the notification.

Sd/-
Registrar
Sant Gadge Baba Amravati University

Appendix – A

Syllabus Prescribed for B.Sc. I (Semester-I to II) Examination to be implemented from the Academic Session 2015-16
Semester I

**1S Mathematics Paper-I
(Algebra and Trigonometry)**

- Unit-I** : **De Moivre's theorem**, roots of complex number, circular functions, hyperbolic function, inverse hyperbolic function. Relation between circular functions and hyperbolic functions. Separation of real and imaginary parts of the circular and hyperbolic functions of complex variable.
- Unit-II** : Trigonometric series: Gregory series, Euler's series, Machin's series, Rutherford's series, summation of series, series based upon $\sin x$, $\cos x$, $\sinh x$, $\cosh x$, exponential series, logarithmic series and series based upon Gregory series.
- Unit-III** : Elements of quaternion: Definition. Equality and addition, multiplication, complex conjugate of a quaternion, norm, inverse, quaternion as a rotation operator, geometric interpretation, a special quaternion product, operator algorithm, quaternion to matrices.
- Unit-IV** : Theory of equations: Relations between the roots and coefficients, transformation of equations, cubic equations (Cardon method), Descarte's rule of signs, biquadratic equations.
- Unit-V** : **Matrices**: Rank of a matrix, row rank, column rank, eigenvalues, eigenvectors and the characteristic equation of a matrix. Cayley-Hamilton theorem and its application.

References Books:

- 1] K.B.Datta, Matrix and Linear Algebra, Prentice Hall of India Pvt.Ltd. New Delhi, 2000.
- 2] H.S.Hall and S.R.Knight, Higher Algebra, H.M.Publications, 1994.
- 3] Chandrika Prasad, Text Book on Algebra & Theory of Equations, Pothishala Private Ltd., Allahabad.
- 4] S.L.Loney, Plane Trigonometry Part-II, MacMillan & Co., London.
- 5] R.S.Verma & K.S.Shukla, Text Book on Trigonometry, Pothishala Pvt.Ltd. Allahabad.
- 6] Ayres Jr Frank : Matrices : Schaum's outline series, McGraw Hill Book Company, Singapore, 1983.
- 7] T M Karade, Maya S.Bendre, Lectures on Algebra and Trigonometry.
- 8] Hohn Franz E : Elementary Matrix Algebra, Amerind Publishing Co., Pvt.Ltd. 1964.
- 9] Spiegel M.R. :Comples Variables, Schaum's outline series, McGraw Hill, 1981.
- 10] Shanti Narayan : A Test Book of Matrices, S.Chand & Co. Delhi.
- 11] Jack B Kuipers: quaternion algebra of Quaternions and rotation sequences, Princeton University Press, Fifth printing, 2002.

Semester I

**1S Mathematics Paper-II
(Differential and Integral Calculus)**

- Unit-I** : Definition of the limit of a function, basic properties of limits, continuous functions and classification of discontinuities.
- Unit-II** : Differentiability, successive differentiation, Leibnitz theorem, indeterminate forms and L'Hospital rule.
- Unit-III** : Rolle's theorem, Lagrange's mean value theorem, Cauchy's mean value theorem, Maclaurin and Taylor series expansions.
- Unit-IV** : Partial derivatives and differentiation of real valued function of two variables, homogeneous functions, Euler's theorem on homogeneous functions.
- Unit-V** : Integration of the form $\int \frac{P_n(x)}{\sqrt{Q}} dx$, reduction formulae for $\int \sin^n x dx$, $\int \cos^n x dx$ and Walli's formula, $\int \tan^n x dx$, $\int \cot^n x dx$, $\int \sec^n x dx$, $\int \operatorname{cosec}^n x dx$, $\int \sin^n x \cdot \cos^m x dx$, quadrature, rectification,

References :

- 1] Ayres F Jr. : Differential equations, Schaum's outline series, McGraw Hill, 1981.
- 2] Ayres F.Jr. : Calculus, Schaum's Outline series, McGraw Hill, 1981.
- 3] Karade T.M., J.N.Salunke, M.S.Bendre : Graduate level Calculus, Sonu-Nilu, 5, Bandu Soni layout, Gayatri Road Parsodi, Nagpur.
- 4] Karade T.M., Maya S. Bendre : Integration and Differential equations, Sonu- Nilu, 5, Bandu Soni layout, Gayatri Road Parsodi, Nagpur.
- 5] Edwards J : Differential Calculus for Beginners, MacMillan and Co.Ltd.,1963.
- 6] Edwards J : Integral Calculus for Beginners, AITBS, Publishers and Distributors, 1994.
- 7] Forsynth A.R.: ATreatise on Differential Equations, (Sixth Edition) MacMillan and Co.1956.
- 8] Greenspan D. : Introduction to Calculus, Harper and Row, 1968.
- 9] Gorakh Prasad: Differential Calculus, Pothishala Pvt. Ltd., Allahabad.
- 10] Gorakh Prasad : Integral Calculus, Pothishala Pvt. Ltd., Allahabad.
- 11] Erwin, Kreyszig :Advanced Engineering Mathematics, John Wiley & Sons, 1999.
- 12] N.Piskunov : Differential and Integral Calculus, Peace Publishers, Moscow.

Appendix – B

Semester II

**2S Mathematics Paper-III
(Differential Equations: Ordinary and Partial)**

- Unit-I** : Degree and order of a ordinary differential equation, linear differential equations and differential equations reducible to the linear form. Exact differential equations. Differential equations of first order and higherdegree, differential equations solvable for p and y, differential equations in Clairaut's form. Orthogonal trajectories.
- Unit-II** : Second order linear differential equations with constant coefficients, homogeneous linear ordinary differential equations, equations reducible to homogeneous differential equations.

- Unit-III** : Reduction of order, transformation of the equation by changing the dependent variable and independent variable, normal form, method of variation of parameters. Ordinary simultaneous differential equations.
- Unit-IV** : Formation of partial differential equations, partial differential equations of the first order, total differential equation (Pfaffian). Lagrange's method, some special types of equations which can be solved easily by methods other than the general method.
- Unit-V** : Compatible differential equations. Charpit's general method of solution, partial differential equations of second and higher orders. Homogeneous and non-homogeneous equations with constant coefficients.

References :

- 1] Ayres F Jr. : Differential equations, Schaum's outline series, McGraw Hill, 1981.
- 2] Ayres F.Jr. : Calculus, Schaum's Outline series, McGraw Hill, 1981.
- 3] Birkhoff G : Ordinary Differential equations, John Wiley and Sons, and Rota G.C.1978.
- 4] Coddington : An Introduction to Ordinary Differential Equations, E.A.Prentice Hall of India, 1998.
- 5] Karade T.M., Bendre M.S.: Lectures on Calculus and Differential and Equations, Sonu-Nilu, 5, Bandu Soni layout, Gayatri Road Parsodi, Nagpur.
- 6] Murray D.A.: Introductory course in Differential Equations, Orient Longman(India), 1967.
- 7] Erwin, Kreyszig: Advanced Engineering Mathematics, John Wiley & Sons, 1999.
- 8] Piaggio HTS: Differential Equations, CBS Publishers & Distributors, Delhi, 1985.
- 9] Siminons G.F. : Differential Equations, Tata McGraw Hill, 1972.
- 10] Karade T.M., Maya S. Bendre : Integration and Differential equations, Sonu- Nilu, 5, Bandu Soni layout, Gayatri Road Parsodi, Nagpur.
- 11] T.M.Karade, Lectures on Differential Equations, Sonu Nilu Publication, Nagpur.
- 12] A.R.Forsyth. A Treatise on Differential Equations. Macmillan and Co.Ltd.London.
- 13] Ian N., Sneddon, Elements of Partial Differential Equations. McGraw-Hill Book Company, 1988.
- 14] Jane Cronin. Differential equations, Marcel Dekkar, 1994.
- 15] Frnak Ayres. Theory and Problems of Differential Equations. McGraw Hill Book Company, 1972.
- 16] Richard Bronson, Theory and Problems of Differential Equations. McGraw Hill Inc, 1973.

Semester II

2S Mathematics Paper-IV

(Vector Analysis and Solid Geometry)

- Unit-I** : Scalar and vector product of three vectors, product of four vectors, vector differentiation and vector integration.
- Unit-II** : Space curve t, n, b vectors, fundamental planes, curvature, torsion, Frenet-Serret formulae.
- Unit-III** : Gradient, divergence and Curl, directional derivative, line integral (existence and evaluation), work done, Greens theorem.
- Unit-IV** : Sphere: Different forms of sphere, section of a sphere by a plane, sphere through a given circle, intersection of sphere and a line, orthogonal sphere and condition of orthogonality.
- Unit-V** : Cone : The equation of a cone with a guiding curve, cone with vertex and origin, right circular cone. Cylinder: equation of right circular cylinder.

References :

- 1] Murray R. Spiegel, Theory and problems on Advanced Calculus, Schaum Publishing Company, New York.
- 2] Murray R. Spiegel, Vector Analysis, Schaum Publishing Company, New York.
- 3] N.Saran and S.N.Nigam , Introduction to vector Analysis Pothishala Pvt.Ltd.Allahabad.
- 4] Erwin Kreyszig Advanced Engineering Mathematics, John Wiley & sons, 1999.
- 5] Shanti Narayan, A Text Book of Vector Calculus, S.Chand & Co. New Delhi.
- 6] S.L.Loney, The elements of Co-ordinate Geometry Macmillan and Company, London.
- 7] Gorakh Prasad and H.C.Gupta, Text Book on Co-ordinate Geometry, Pothishala Pvt.Ltd.Allahabad.
- 8] T.M.Karade, Maya S. Bendre, Lectures on Vector analysis and geometry, Sonu Neelu Publication, Nagpur.
- 9] R.J.T.Bell, Elementary Treatise on Co-ordinate Geometry of Three Dimensions, Macmillan India Ltd., 1994.
- 10] P.K.Jain and Khalil Ahmad, A Text Book of Analytical Geometry of Two Dimensions, Wiley Eastern Ltd., 1994.
- 11] P.K.Jain and Khalil Ahmad, A Text Book of Analytical Geometry of Three Dimensions, Wiley Eastern Ltd, 1999.
- 12] N.Saran and R.S.Gupta, Analytical Geometry of three dimensions, Pothishala Pvt.Ltd.Allahabad.

Appendix-C

B.Sc. Part-I (Sem-I & II) (Zoology) to be implemented from Academic Session 2015-16.

- A) The existing Practical course of 1S Zoology of Semester-I (Prospectus No.2014121) be substituted by the following :-**

LIFE AND DIVERSITY OF NON-CHORDATA

Practical : Two practical per week each of 3 period's duration. The Examination shall be of 4 hrs duration and of 50 marks.

I-Life and diversity of non-chordata

1. Observation, Classification up to classes and sketching of the following animals, (Specimens or Models):
 - Phylum Protozoa: *Plasmodium* trophozoite, *Euglena*, *Entamoeba histolytica*.
 - Phylum Porifera: Sycon, Bath sponge, *Euplectella*.
 - Phylum Coelenterata: *Obelia*, *Aurelia*, *Tubipora*.
 - Phylum Helminthes: *Taenia*, *Ascaris* (male & female).
 - Phylum Annelida: Nereis, Earthworm, Leech,
 - Phylum Arthropoda: Prawn, *Limulus*, *Aranea*, *Scolopendra*, *Julus*, Moth, Mosquito.
 - Phylum Mollusca: Chiton, Pila, Dentalium, Unio, Octopus.
 - Phylum Echinodermata: *Antedon*, *Holothuria*, *Echinus*, Sea star, Brittle star
 - Phylum Hemichordata: *Balanoglossus*

2. Study of Permanent slides:
L.S.Sycon, nematocyst, Ascaris egg, T.S. Ascaris through gonads, T.S.Leech through crop, Compound eye of insect, Radula, Gill lamella and Osphradium of *Pila*, Scolex and Gravid Proglottid of *Taenia*.
3. Anatomical Study through Computer Aided Techniques, Video Clipping Models, Photographs and other available resources :
a) Leech/Earthworm: Alimentary canal, Reproductive system, Nervous system,
b) Grasshopper/Cockroach: digestive system, Nervous system, Reproductive system
c) Culture of *Paramecium* and *Volvox* (To be given to all students)
4. Mountings :
a) Mosquito (*Aedes*, *Culex* and *Anopheles*) : wings, legs, mouth parts
b) Housefly: Mouth parts, legs, wings
c) *Paramecium* and *Volvox*

Distribution of Marks during Practical Examination: Time : 4 hrs.

i) Identification and comments on spots (1-8) - 4 specimens, 4 slides.....	12 Marks
ii) Labelling of Anatomical diagrams provided (Two)	10 Marks
iii) Permanent stained micro preparation.	08 Marks
iv) Study tour diary -	04 Marks
v) Permanent stained micro preparation Submitted by examinee.....	04 Marks
vi) Certified class record -	05 Marks
vii) Check list of 20 locally available invertebrate fauna.....	02 Marks
viii) Viva- voce -	05 Marks

Total: - 50 Marks

Note:

- 1] One or two short excursion / study tours are compulsory for observation of animals in their natural habitat.
- 2] Candidates shall be required to produce at the practical examination the following.
 - Practical record book duly signed by the teacher in charge and Certified by the Head of the department as bonafide work of the Candidate.
 - Five permanent stained micro preparations.
 - Study tour report and field diary duly signed by the teacher.

B) The existing Practical course of 2S Zoology of Semester-II (Prospectus No.2014121) be substituted by the following :-

CELL AND DEVELOPMENTAL BIOLOGY

I) Cell Biology:-

1. Use, care and maintenance of microscope.
2. Bacterial Culture, Gram staining.
3. Permeability tests using erythrocytes.
4. Preparation of Polytene chromosome in *Chironomus* or *Drosophila* larva.
5. Preparation of various stages of mitosis in Onion root tip.
6. Preparation of various stages of meiosis in insect's testis.

II) Developmental Biology.

1. Study of stages of Gametogenesis in rat/frog, (Permanent Stained Slides)
2. Study of different of types animal eggs
3. Study of developmental stages (Life Cycle) of Cockroach, Housefly, mosquito, Butterfly, Moth, Frog (Any Four).
4. Sperm in physiological saline using phase contrast optics.
5. Demonstration of developing chick through available resources.
6. Developmental stages of frog: Cleavage, blastula, gastrula, neurula, and tadpoles through available resources.
7. Permanent slides of chick embryos at 24, 36, 48, 72 hrs of incubation.
8. Study of different types of placenta with suitable histological slides or visual diagrams.

Distribution of Marks during Practical Examination: Time : 4 hrs.

i) Identification and comments on spots (1-8) – 4 Cytological, 4 Embryological ...	16 Marks
ii) Cytological Preparation.....	10 Marks
iii) Comments on given Life Cycle	10 Marks
iv) Certified class record -	05 Marks
v) Submission of photographs of any three crop pests	04 Marks
viii) Viva- voce	05 Marks

Total: -50 Marks

Appendix-D

Syllabus of B.Sc. Part- I (Semester- I & II) (Forensic Science) (Effective from session 2015-16)

1S Forensic Science (Basics of Forensic Science)

The examination in Forensic Science of First 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 4 to 6 hours duration and carry 50 marks.

The following syllabus 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-I (8 marks).

B.Sc. Part- I (Semester- I)

1S Forensic Science (Basics of Forensic Science)

Total Lectures: 84

Marks: 80

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

- Unit I : Developmental Growth of Forensic Science 14L**
Introduction to Forensic science – nature, need and function. Laws and Principles, basics of Forensic Science. Historical development and scope of Forensic Science in India. Investigating officers and their assigned role and duties. Global perspective in the field of forensic science: history, development, education and training. Organizational setup of forensic science lab and other national & international agencies. Ethical issues in Forensic Science.
- Unit II : 14L**
A) Forensic Science Laboratories and Facilities [5L]
Growth of Forensic Science Laboratories in India – Central and State level Laboratories. Services and functionalities provided by various FSLs. Various divisions in the FSL.
B) Recognition of Bloodstain Patterns [9L]
History of Bloodstain Pattern interpretation, properties of human blood, target surface considerations, Size, Shape and Directionality of bloodstains, Spattered blood, other Bloodstain Patterns, interpretation of Bloodstain on clothing and footwear, Documentation and Photography for Bloodstain Pattern Analysis.
- Unit III : Crime and Crime Scene management 14L**
Criminals, criminal behavior, Crime Scene survey, physical evidence, collection preservation types and importance of criminal investigations. Components of Crime Scene Management – Information management, manpower, technology & logistics management, role of crime scene managers and first responding officers. Crime Scene Reconstruction: defining crime scene reconstruction, nature & stages of crime scene reconstruction.
- Unit IV : Impressions and Prints 14L**
Finger prints: Nature, Location, collection and evaluation, taking control samples, Forensic Significance.
Footprints: Importance, Gait Pattern, Casting of footprints in Different medium, Taking Control samples.
Tire Marks/prints and Skid marks, taking control samples, Forensic Significance.
Lip Prints: Nature, Location, collection and evaluation, taking control samples, Forensic Significance.
Bite Marks: Nature, Location, collection and evaluation, taking control samples, Forensic Significance.
Ear Prints: Nature, Location, collection and evaluation, taking control samples, Forensic Significance.
- UNIT V : Forensic Documents 14L**
Various types of forensic documents: genuine and forged documents, classification of forensic documents: Specimen writings, admitted writings, Handling, preservation and marking of documents, natural variation and disguise in writing, Principle of Handwriting Identification, general and individual characteristics, Basic Tools needed for forensic documents examination and their use. Functions of a Forensic Document Examiner.
- Unit VI : Forensic Medicine 14L**
Global Medical Jurisprudence, Legal Procedure in India, Documentary evidence: Medical certificates, medical reports, dying declaration. Determination of time since death, including by histopathological methods. Medico legal investigation of sexual offences, including examination of victims and suspects. Medico legal aspects of death: causes of death such as asphyxia, electrocution, thermal trauma, heat burns, starvation, natural death, sudden death, death by accident. Medico legal aspects of wounds: medical and legal definition of wounds, types of mechanical and regional injuries, aging of wounds.

Semester- I

1S Forensic Science (Basics of Forensic Science)

Total Laboratory sessions: 21

Marks: 50

List of Practicals

1. Collection and Handling of Petroleum samples.
2. Collection and Handling of murder case samples.
3. Collection and Handling of fire crime scene samples.
4. Sketching and Photography of various type of crime scene.
5. Document and Fingerprint Photography.
6. To take Plain and Rolled inked fingerprints and to identify the patterns.

7. To develop Latent fingerprints with Powder method.
8. Lifting of Fingerprints.
9. Detection of forgeries including traced and stimulated forgery and built up documents.
10. Examination of security features of Currency Notes and Indian Passports.
11. Report writing and interpretation.
12. Scientific Report Writing.
13. Blood Spatter Analysis.
14. Identification of Handwriting General and individual characteristics.
15. Detection of various type of forgery.
16. Identification of Indented and Invisible writing.
17. Identification of typescripts and printing matter.

Distribution of Marks for Practical Examination.

Time: 4 – 6 hours	Marks: 50
Exercise- I	..... 12
Exercise- II	..... 12
Exercise- III	..... 12
Viva-Voce	..... 07
Record	..... 07

	Total: 50

Books Recommended:

1. Introduction to Forensic Science in Crime Investigation By Dr.(Mrs.) Rukmani Krishnamurthy.
2. Forensic Biology by Shrikant H. Lade.
3. Crime Scene Processing and Laboratory Work Book by Patric Jones.
4. Forensic Science: An Introduction to Scientific and Investigative Techniques 3rd ed. by Stuart H. James.
5. Crime Scene Management with Special Emphasis on National level Crime Cases by Dr. Rukmani Krishnamurthy under publishing.
6. Forensic Science: An Introduction to Scientific and Investigative Techniques By S.H James, J J Nordby.
7. Advanced Crime Scene Photography by C.D. Duncan.
8. Scientific Examination of Questioned Documents by Ordway Hilton.
9. Questioned Documents by Albert S. Osborn.
10. Suspect Documents their scientific examination By Wilson R. Harrison.
11. Speculation in Fingerprint Identification By Chatterjee S. K.
12. Criminal Investigation, Practical Fingerprinting by Briges B. C.
13. Forensic Science in India: A vision for the twenty first century Nanda, B.B. & Tewari, R.K.(2001)New Delhi.
14. Forensic Science: An introduction to scientific and investigative techniques, James, S. H. and Nordby, J. J. (2003) CRC Press, USA.

**B. Sc. Part I (Semester II) Forensic Science
2S Forensic Science (Forensic Chemistry)**

The examination in Forensic Science of Second 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 4 to 6 hours duration and carry 50 marks.

The following syllabus 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-I (8 marks).

Total Lectures: 84

Marks: 80

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

Unit I	14L
A) Qualitative-Quantative Analysis	[5L]
Organic - inorganic products - oils, paints, petroleum products, cement.	
B) Forensic Chemistry	[5L]
Screening, sampling-methods type (collection), statistical method, different standard methods, Inorganic analysis, Micro-chemical methods for forensic analysis.	
C) Miscellaneous	[4L]
Characteristics/examination/act/organic-inorganic products-Gold, silver, tobacco, milk, coffee, tea, sugar, salts, fertilizers, dyes, drugs, paints, fats, various acts (legal aspects).	
Unit II : Separation and detection technique	14L
Gas chromatography: Theoretical principles, instrumentations and technique, columns, stationary phases, detectors, Forensic applications. HPLC: Review of theory, Instrumentation, Technique, column, detectors, LC-MS, Forensic applications. Atomic Absorption Spectroscopy and Flame spectrometry - Theory and Forensic applications.	
Unit III : Forensic Toxicology	14L
Introduction and concept of forensic toxicological examination and its significance. Poisons: (Plant Poison, Animal Poison, Metallic Poison) classification of poisons, types of poisoning, collection and preservation of toxicological exhibits in fatal and survival cases, signs and symptoms of poisoning, mode of action and its effect on vital functions, medico-legal and post mortem examination report/finding studies, specific analysis plan/approach to toxicological examination of poisoning samples, excretion of poisons, detection of poisons on the basis of their metabolic studies, interpretation of analytical data and forming of opinion.	

- Unit IV : Narcotic Drugs and Psychotropic Substances** **14L**
 Analysis of Narcotic Drugs and Psychotropic Substances, Drug effects, drug Hazards, Tolerance and dependence of drugs, Problems of drug addiction, Identification of drug addict, Drug addicts and crimes, Classification of Narcotics and other drugs, Analytical techniques for identification of drugs. Types of Pharma drugs, Steroids, Forensic Pharmacological studies, Ingestion of drugs, absorption, distribution, metabolism, pathways of drug metabolism, drug metabolism and drug toxicity, excretion of drugs.
- Unit V : Study of Analysis of Beverages** **14L**
 Introduction, Definition of alcohol and illicit liquor, Alcoholic and non-alcoholic beverages and their composition, Proof spirit, absorption, de-toxication and excretions of alcohol, problems in alcohol cases and difficulties in diagnosis, Alcohol and prohibition, Consequences of drunken driving, Analytical techniques in the analysis of alcohol and other articles. Case study.
- UNIT VI : Miscellaneous Topics** **14L**
Arson: chemistry of fire, investigation and evaluation of clue material, analysis of arson exhibits by instrumental methods: Management of Arson cases. **Food adulteration:** Introduction, Prevention of food adulteration, Analytical techniques for analysis of exhibits involved in food and other material cases. **Relevant provision of:** 1. Prevention of Food Adulteration Act 1954 (Definition, Power of Food Inspector, Offences and Penalties), 2. Narcotic Drugs & Psychotropic Substances Act 1985 (Definition, Licit Opium Cultivation, Minimum and Commercial Quantity in Narcotic Drugs, Offences and Penalties), 3. Prevention of Illicit Trafficking in NDPS Act 1985 (Detention of a Person Under the Act), 4. Drugs Control Act 1940 (Definition, Power of Chief Commissioner Under the Act), 5. Drugs & Cosmetics Act 1945 (Definition, Adulterated, Misbranded, Spurious Drugs and Cosmetics, Offenses and Penalties).

Semester- II
2S Forensic Science (Forensic Chemistry)

Total Laboratory sessions: 21

Marks: 50

List of Practicals :

1. Identification of food adulteration - vegetable oil, Cold drinks etc. (2 nos).
2. Quantitative or qualitative study of drug opiates. (2 nos).
3. Examination of fire arson cases by GC, TLC. (1 nos).
4. Detection and determination of various adulterants in alcohol, by colour tests.(Qualitative analysis) (2 nos.).
5. Analysis of Jaggery samples.
6. Qualitative Test for Examination of Ethyl Alcohol in Human Blood.
7. Detection of Inorganic Poison As, Hg, Cu, Ba, PO₄⁻ etc.
8. Colour Tests for identification of poisons, drugs. (2 nos).
9. Plant, animal, Metallic poison analysis. (2 nos.).
10. Quantitative Estimation of Zinc Phosphate.
11. Separation of Sampling Material by TLC (drugs, poison etc.) (2 nos).
12. Study of Steroids (separation by TLC).
13. Examination of chemicals used in Trap cases by UV-visible spectroscopy. (2 nos)
14. Analysis of Molasses Samples.
15. Analysis of Medicinal and Toilet preparation samples.
16. Analysis of French Polish.
17. Analysis of Ammonium Chloride and Sodium Chloride Mixture Samples.
18. Analysis of Soft Drinks.
19. Analysis of Diesel.

Distribution of Marks for Practical Examination :

Time: 4 – 6 hours

Marks: 50

Exercise- I	.....	12
Exercise- II	.....	12
Exercise- III	.....	12
Viva-Voce	.....	07
Record	.....	07

Total: 50

Books Recommended:

1. Instrumental Analysis by Skoog, Holler and Crouch.
2. Instrumental Method of Chemical Analysis. Chatwal & Anand, Himalya Publication.
3. Advance in Chromatography by Brown P. R.
4. Introduction of Forensic Science in Crime Investigation by Dr. (Mrs.) R. Krishnamurthy.
5. Howard: Forensics Analysis by Gas Chromatography.
6. Methods in Toxicology Anmol Publication, New Delhi (1998) by Prakash M. et.al.
7. The basic Science of Poisons Casarett & Doll Toxicology,
8. Instrumental Methods of Analysis, Willard H. H. et. al : 1974.
9. Hand book of drug and alcohol abuse by Holmann, F. G.
10. Bare Acts with short notes on the following : Narcotic Drugs & Psychotropic Substances Act, Drugs & Cosmetics Act, Explosive Substances Act, Dowry Prohibition Act, Prevention of Food Adulteration Act, Prevention of Corruption Act, Arms Act, Wild Life Protection Act
11. Practical Books : Physical Chemistry Practicals by J.B. Yadav.
12. Qualitative Analysis by Vogel.

NOTIFICATION

No. : 52 / 2015

Date: 18/06/2015

Subject : Continuation of Prospectus No.2015122 prescribed for B.Sc. Part-II for the Session 2015-16.

It is notified for general information of all concerned that the Prospectus of B.Sc.Part-II (Sem-III & IV) bearing No.2015122 prescribed for the Academic Session 2014-15 shall continue for the session 2015-16 along with the following substitutions/additions.

- i) The existing practical syllabi of B.Sc.Part-II Sem-III "3S Zoology" mentioned on Page Nos. 68-70 be substituted by the practical syllabi given in **Appendix-A** appended with this notification.
- ii) In the practical course of Semester-IV (Prospectus No.2015122) 4S Zoology, Section-B, Sr.No. '5. Field Collection Methods' given on page No.74 be deleted.
- iii) The books be added as reference books as given in the following table.

Sr. No.	Name of the Book/Publisher	Name of Author	Book be added in the list of
1	A Text Book of Botany – Cell Biology, Genetics and Biochemistry (2014) published by Nabh Prakashan, Amravati	Dr.N.H.Shahare, Dr.D.V.Hande, Dr.S.S.Ingale, Dr.G.C.Kamble, Dr.Mrs.R.C.Maggirwar, Dr.N.S.Dharkar	Reference book for B.Sc.-II, Sem-IV for the subject Botany on page no. 52 at sr.no.29.
2	Trees of Vidarbha (A field guide to flowering trees)	Dr. M.M. Dhore Sh. P.S. Lachure Sh. P.D. Gawande	Reference book for B.Sc.-II, Sem-III for the subject Botany on page no.48 at sr.no.35.

Sd/-
Registrar
Sant Gadge Baba Amravati University

Appendix-A

B.Sc.Part-II (Sem-III) (Zoology) Practical course to be implemented from Academic Session 2015-16.

The existing Practical course of 3S Zoology of Semester-III (Prospectus No.2015122) be substituted by the following:

PAPER III: LIFE AND DIVERSITY OF CHORDATA AND CONCEPT OF EVOLUTION

Practical:- Two practical per week of 3 periods duration. Examination shall be of 5 Hrs duration and of 50 marks.

A) Taxonomy of Chordata:

1. General characters and classification of Phylum Chordata:
2. General characters and Classification up to orders of the following chordates or as per the availability in the laboratory from the major orders, (Specimens or Models or with available resources) :
Protochordata: Herdmania, Doliolum Salpa, Amphioxus. Agnatha: Petromyzon, Myxine.
Pisces: Scoliodon, Torpedo, Acipenser, Exocoetus. Hippocampus.
Amphibia: Ichthyophis, Salamander, Bufo, Hyla.
Reptilia: Varanus, Phrynosoma, Chameleon, Cobra, krait, Russell's viper, Typhlops, Hydrophis.
Aves: Duck, Woodpecker, Kingfisher, Parrot.
Mammalia: Mongoose, Squirrel. Manis. Bat., monkey.

B) Anatomical Study through Computer Aided Techniques, Video Clipping, Models, Photographs and other available resources :

1. Frog: Viscera, digestive system, male reproductive system, and female reproductive system.
2. Rat / Mouse / Rabbit - Digestive system, Arterial system, venous system, reproductive systems.

C) Slides of Hair impressions of different locally available mammals.

D) Osteology. Fowl, Rabbit (Excluding loose bones of skull)

E) Evolution:

1. Study of fossils and living fossils.
2. Study of Evidences of evolution.
 - i) Analogous and Homologous organs. ii) Connecting links (Peripatus, Archaeopteryx, Echidna, Duck bill platypus)
3. Mimicry, coloration in animals through available examples in the laboratory.
4. Beak and Leg modifications with reference to: Parrot, Woodpecker, Kingfisher, Heron, Duck, Sparrow/Pigeon, Hawk/Kite, Owl.

F) Histological Slides :

- Amphioxus: T.S, Oral hood, Pharynx, Tail
Frog: - T.S. lung, Stomach, Kidney, Intestine.

DISTRIBUTION OF MARKS FOR PRACTICAL EXAMINATION.

- | | |
|--|-------------|
| 1. Labelling of Anatomical diagrams provided (at least two) : | 10 (5 each) |
| 2. Slide of Hair Impression | 05 |
| 3. Spotting. (Specimens, Slides, bones, fossil) | 10 |
| 4. Practical on evolution - | 10 |
| 5. Class record duly signed by teacher in charge and certified by H.O.D. | 05 |
| 6. Viva - Voce | 05 |
| 7. Submission of checklist of twenty five locally available vertebrates | 05 |

Total Marks: 50

NOTIFICATION

No. : 53/2015

Date: 18/06/2015

Subject : Changes in the syllabi and recommended books for B.Sc. Part-III (Sem-V & VI) (Prospectus No.2013123) for the Session 2015-16.

It is notified for general information of all concerned that the Prospectus of B.Sc.Part-III (Sem-V & VI) bearing No.2013123 prescribed for the Academic Session 2014-15 shall continue for the session 2015-16 along with the following substitutions/additions.

- i) The existing practical syllabi of B.Sc. Final Sem-V “5S Zoology” mentioned on Page Nos. 77-78 be substituted by the practical syllabi given in **Appendix-A** appended with this notification.
- ii) The existing practical syllabi of B.Sc. Final Sem-VI “6S Zoology” mentioned on Page Nos. 80-81 be substituted by the practical syllabi given in **Appendix-B** appended with this notification.
- iii) The books be added as reference books as given in the following table.

Sr. No.	Name of the Book/Publisher	Name of Author	Book be added in the list of
1	Industrial Microbiology, Himalaya Publishing House.	Dr.G.L.Bhoosredy, Dr.B.J.Wadher, Dr.A.V.Gomashe, Dr.Mrs.K.V.Dubey	Reference book for B.Sc.-III, Sem-VI for the subject Industrial Microbiology on page no.130 at sr.no.13.
2	General Enzymology, Kulkarni and Deshpande, Himalaya Publishing House.	Kulkarni and Deshpande.	Reference book for B.Sc.-III, Sem-VI for the subject Microbiology on page no.117 at sr.no.5.
3	Modern Approaches to Soil & Agriculture and Environmental Microbiology, Himalaya Publishing House.	Shiva Aithal & Nikhilesh Kulkarni.	Reference book for B.Sc.-III, Sem-V for the subject Microbiology on page no.113 at sr.no.10.
4	Modern Algebra (group- rings) Sonu Nilu Publication, Nagpur (1st Edition – May-2014)	T.M. Karde, J.N. Salunke, S.D. Katore, Rekha Rani	Reference book for B.Sc.-III, Sem-V for the subject Mathematics (Modern Algebra) on page no.3 at sr.no.12.

Sd/-
Registrar
Sant Gadge Baba Amravati University

Appendix-A

The existing Practical course of 5S Zoology of Semester-V (Prospectus No.2013123) be substituted by the following :-

Practicals:

1. Detection of blood groups in human being.
2. Differential counts of blood.
3. Estimation of hemoglobin percentage with the help of haemometer.
4. R.B.C. count.
5. W.B.C. count.
6. Preparation of haemin crystals
7. Measurement of blood pressure.
8. Action of salivary amylase on starch.
9. Qualitative detection of nitrogenous waste products (Ammonia, urea, uric acid) in given sample.
10. Demonstration of kymograph unit, Respirometer through available resources.
11. Observation and identification of Insect Pests of local crops, and predator insects.
12. Life Cycles of Honey bee, Lac insect, Silk Moth.
13. Histological Slides of major organs of Respiratory systems, circulatory system, Nervous system, Different types of Muscles, Endocrine glands, testis, ovary.
14. Study of locally available fishes, Indian major carps, Exotic carps, Common carp.

Distribution of marks for practical examination:	Time: 5 Hrs.	Marks
01. Physiological Expt.		
a) Major.....		10
b) Minor		05
02. Economic Zoology & Histology		
a) Spotting (A-F)		12
b) Description and Comments on Topic from Unit V and VI		08
04. Class record duly signed by teacher in charge and certified by H.O.D.		05
05. Study tour report.		05
06. Viva - voce		05

Total Marks 50

The existing Practical course of 6S Zoology of Semester-VI (Prospectus No. 2013123) be substituted by the following:-

(MOLECULAR BIOLOGY AND BIOTECHNOLOGY)

Practicals:

1. Microtechnique scope and importance.
2. Preparation of fixatives - Alcohol, Acetone, Formalin, Bouin's fluid, Cornoy fluid, Formal sublimate.
3. Collection of various tissues/organs from slaughter house for micro-technique
4. Preparation of Alcoholic grades, dehydration and clearing of tissues
5. Use and care of Oven
6. Embedding and block making, trimming of block.
7. Use and Care of different types of Microtome.
8. Honing and stropping Knives
9. Section cutting and spreading,
10. Preparation of various stains -Borax carmine Acetocarmin, Aceto-orcein, Haematoxyline, eosin.
11. Staining of the sections, (Double Staining), mounting.
12. Camera Lucida. Use and Drawings
13. Oculomicrometer scale/ similar micro-measurements use
14. Introduction to models of PCR, Southern blotting through available resources.
15. Vital Staining of mitochondria by using Janus, Green B stain.
16. Extraction of DNA by using salt, detergent and enzymes from natural sources from any animal tissue / plant material
17. Study of Operon models through available resources.
18. Application of DNA finger printing through available resources.

Distribution of marks for practical examination:	Time: 5 Hrs.	Marks
01 Microtechnique.		
a) Trimming and Section cutting of the Paraffin blocks		05
b) Spreading of ribbons.		05
c) Staining of the given slide		10
d) Use of camera Lucida/ Ocular micrometer scales		05
02. Any one practical based on Sr.14 to 18 of the practical list		10
03. Permanent slides submitted by the examinee (5 Slides)		05
04. Class record duly signed by teacher incharge and certified By H.O.D.		05
05. Viva - voce		05

 Total Marks 50

NOTIFICATION

No. : 54/ 2015

Date: 18/06/2015

Subject : Continuation of Prospectus No.2015129 prescribed for M.Sc.Part-I & II (Mathematics) for the Session 2015-16.

It is notified for general information of all concerned that the Prospectus of M.Sc.Part-I & II (Sem-I to IV) (Mathematics) bearing No.2015129 prescribed for the Academic Session 2014-15 shall continue for the session 2015-16 along with the following substitutions/additions.

- i) The existing syllabi of M.Sc.Part-I (Sem-I & II) "Mathematics" mentioned on Page Nos.1-18 be substituted by the syllabi given in **Appendix-A** appended with this notification.
- ii) The book "Elements of General Relativity" by T.M.Karde, K.S.Adhav, S.D.Katore, M.S.Bendre, be added as reference book for M.Sc. Part-II (Semester-III) on page no.22 at sr.no.10.

Sd/-
 Registrar
 Sant Gadge Baba Amravati University

Appendix-A

Syllabus prescribed for M.Sc. Part-I (Mathematics) Semester-I & II to be implemented from the Academic Session 2015-16.

M. Sc. Part-I Semester-I:

Compulsory Papers

Paper-I (101)	Real Analysis
Paper-II (102)	Advanced Abstract Algebra
Paper-III (103)	Complex Analysis
Paper-IV (104)	Topology-I

Optional Papers: Choose Any One.

Paper-V (105)	Differential Geometry
Paper-V (106)	Advanced Discrete Mathematics-I

M. Sc. Part-I Semester-II:

Compulsory Papers

Paper-VI (201)	Measure and Integration Theory
Paper-VII (202)	Advanced Linear Algebra and Field Theory
Paper-VIII (203)	Integral Equation
Paper-IX (204)	Topology-II

Optional Papers: Choose Any One.

Paper-X (205)	Riemannian Geometry
Paper-X (206)	Advanced Discrete Mathematics-II

**M.Sc.-I (MATHEMATICS)
 SEMESTER-I
 Paper-I (101): REAL ANALYSIS**

- Unit-I** : Definition and existence of Riemann Stieltjes integral, properties of the integral, Integration and differentiation. The fundamental theorem of calculus, integral of vector valued function, rectifiable curves.
- Unit-II** : Sequences and uniform convergence, Cauchy criterion for uniform convergence, Weierstrass M-test, Abel's and Dirichlet's tests for uniform convergence, uniform convergence and continuity, uniform convergence and integration, uniform and differentiation, Weierstrass approximation theorem.
- Unit-III** : Rearrangement of terms of a series, Riemann's theorem. Power series, Uniqueness theorem for power series, Abel's limit theorem, Tauber's first theorem.
- Unit-IV** : Functions of several variables, linear transformation, derivatives in an open subset of R^n , chain Rule, partial derivatives, interchange of order of differentiation, Derivatives of higher order, Taylor's theorem.
- Unit-V** : Inverse function theorem. Implicit function theorem, Jacobians, Extremum problems with constraints, Lagrange's multiplier method, Examples on Maxima and Minima, Differentiation of integrals.

References :

- (1) Apostol T.M., Mathematical Analysis, Narosa Publishing House, New Delhi, 1985.
- (2) Eurl D. Rainville : Infinite series, The Macmillan Company, New York.
- (3) Friedman A., Foundations of Modern Analysis, Holt Rinehart and Winston, Inc, New York, 1970.
- (4) Hewitt E. and Starmberg, Real and Abstract Analysis, Berlin, Springer 1969.
- (5) Jain P.K. and Gupta V.P., Lebesgue Measure and Integration, New Age international (P) Ltd., Published, New Delhi, 1986, (Reprint 2000)
- (6) Gabriel Klambaucer, Mathematical Analysis Marcel Dekkar, Inc., New York, 1975.
- (7) Natanson I.P., Theory of Function of real variables, Vol.-I, Frederick Ungar Publishing Co. 1961.
- (8) Parthasarathy K.R., Introduction to Probability and Measure, Macmillan Company of India, Delhi, 1977.
- (9) Royden H.L., Real Analysis, Macmillan Pub. Co. Inc., 4th Edition, New York, 1993.
- (10) R.R. Goldberg : Real Analysis, Oxford & I.B.H. Publishing Co., New Delhi - 1970.
- (11) Serge Lang, Analysis I & II, Addison - Wesley Publishing Company Inc., 1969.
- (12) S.C. Malik and Savita Arora: Mathematical Analysis, Wiley Eastern Ltd., New Delhi.
- (13) S.C. Malik and Savita Arora : Mathematical Analysis, New Age International (P.) Ltd. 2010, Fourth Edition.
- (14) Shani Narayan : A Course of Mathematical Analysis, S.Chand and Company, New Delhi.
- (15) White A.J., Real Analysis, an introduction.
- (16) Karade T.M. and Salunke J.N., Lectures on Advanced Real Analysis, Sonu Nilu Publication, 2004.34
- (17) Walter Rudin, Real & Complex Analysis, Tata McGraw Hill Publishing Co. Ltd., New Delhi
- (18) Robert G. Bartle, Donald R. Sherbert: Introduction to Real Analysis Wiley India Edition 2010
- (19) B. Chaudhari and D. Somasundaram: Mathematical Analysis, Narosa Publishing House, New Delhi
- (20) N.P. Bali, Real Analysis: Golden Math Series (2011) Publish by Firewall Media
- (21) Walter Rudin; Principles of Mathematical Analysis, Mc Graw Hill Books Company, Third Edition 1976, international student edition.

Paper-II(102) : ADVANCED ABSTRACT ALGEBRA

- Unit I** : Normal Subgroups and quotient groups, Isomorphism theorems, Automorphisms, Conjugacy and G-sets, Normal series, Solvable groups, Nilpotent groups.
- Unit II** : Permutation groups, cyclic decomposition, Alternating group A_n , Simplicity of A_n , structure theorems of groups, Direct products, Finitely generated abelian groups, invariants of a finite abelian group, Sylow theorems, Groups of order p^2 , pq .
- Unit III** : Ideals, Homomorphism, Sum and direct sum of ideals, Maximal and prime ideals, Nilpotent and Nil ideals, Zorn's lemma.
- Unit IV** : Unique factorization domain, Principle ideal domain, Euclidean domain, Polynomial rings over UFD.
- Unit V** : Modules- Definition and examples, Sub modules and direct sums, R-homomorphism and quotient modules, completely reducible modules, free modules.

Reference :

- 1) I.N. Herstein, Topics in Algebra, Wiley Eastern Ltd., New Delhi, 1975.
- 2) M. Artin, Algebra, Prentice-Hall of India, 1991.
- 3) P.M. Cohn, Algebra, Vols. I, II & III, John Wiley & Sons, 1982, 1989, 1991.
- 4) N. Jacobson, Basic Algebra, Vols. I & II, W.H. Freeman, 1980.
- 5) S. Lang, Algebra, 3rd edition, Addison - Wesley, 1993.
- 6) I.S. Luthar and I.B.S. Passi, Algebra, Vol. I-Groups, Vol. II - Rings, Narosa Publishing House.
- 7) D.S. Malik, J.N. Mordenson, and M.K. Sen, Fundamentals of Abstract Algebra, McGraw-Hill, International Edition, 1997.
- 8) K.B. Datta, Matrix and Linear Algebra, Prentice Hall of India Pvt. Ltd., New Delhi, 2000.
- 9) S.K. Jain, A. Gunawadana and P.B. Bhattacharya, Basic Linear Algebra with MATLAB, Key College Publishing (Springer - Verlag), 2001.
- 10) S. Kumarsena, Linear Algebra, a Geometric Approach, Prentice Hall of India, 2000.
- 11) Vivek Sahai and Vikas Bist, Algebra, Narosa Publishing House, 1999.
- 12) I. Stewart, Galois Theory, 2nd Edition, Chapman and Hall, 1989.
- 13) J.P. Escofier, Galois Theory, GTM Vol. 204, Springer, 2001.

- 14) T.Y. Lam, Lectures on Modules and Rings. GTM Vol.189, Springer Verlag, 1999.
- 15) D.S. Passman, A Course in Ring Theory, Wadsworth and Brooks/ Cole Advanced Books and Softwares, Pacific Groves, California, 1991.
- 16) J.A. Gallian, Contemporary Abstract Algebra, Narosa Publication.
- 17) A.R. Vashistha, Modern Algebra, Krishna Prakashan Media (P) Ltd.
- 18) V.K. Khanna and Bhambri, a Course in Abstract Algebra, Vikas Publication, House (P) Ltd. (2010).
- 19) John B. Fraleigh, a First Course in Abstract Algebra (Seventh Edition).
- 20) Abstract Algebra (Third Edition) By David S. Dummit, Richard M. Foote, Wilay India Edition.
- 21) Basic Abstract Algebra, P .B.Bhattacharya, S.K.Jani, S.R.Nagpaul

Paper-III (103) : COMPLEX ANALYSIS

- Unit-I** : Complex Integration : Power Series representation of analytic functions, Cauchy's integral formula, higher order derivatives, Cauchy's inequality, Zeros of Analytic function, Liouville's theorem, Fundamental theorem of algebra.
- Unit-II** : Taylor's theorem, Maximum Modulus theorem, Morera's theorem, Counting of zeros, open Mapping theorem, Cauchy-Goursat theorem, Schwarz's lemma.
- Unit-III** : Singularities, Isolated singularities, classification of isolated singularities, Laurent's series development, Casorti-Wierstrass theorem, Argument principle, Rouches theorem.
- Unit-IV** : Residue, Cauchy's residue theorem, Evaluation of integration by using residue theorem, Branches of many valued function (Specially $\arg z$, $\log z$), Hadamard's three circle theorem, Spaces of continuous functions, spaces of analytic functions, Hurwitz theorem
- Unit-V** : Analytic continuation, uniqueness of direct analytic continuation, uniqueness of analytic continuation along a curve, power series method of analytic continuation, Schwartz reflection theorem, Weierstrass factorization principle.

Reference:

- 1) S. Ponnusamy, Foundation of Complex Analysis, Narosa Publishing House, 1967.
- 2) H. S. Kasana, Complex variables: Theory and Application, PHI Learning Pvt. Ltd., New Delhi.
- 3) Schaum's outline series Complex Analysis, Tata McGraw Hill Education Pvt. Ltd., New Delhi (2010).
- 4) J. N. Sharma, Complex Variables, Pragati Publication.
- 5) A. R. Vashistha, Complex Variables, Krishna Publication.
- 6) Murray R. Spiegel, Seymour Lipschutz, Jon J. Schiller, Dennis Spellman., Schaum's outline series Complex Analysis, Tata McGraw Hill Education Pvt. Ltd., 3rd Edition, New Delhi 2010.
- 7) Walter Rudin, Real & Complex Analysis, McGraw Hill Book Co., 1966.
- 8) J. Ward Brown, Ruel V. Churchill, Complex variables and Application, McGraw Hill International Edition (2009).
- 9) H. A. Priestly, Introduction to Complex Analysis, Clarendon Press, Oxford, 1990.
- 10) Liang-Shin Hahn & Bernhard Epstein, Classical Complex Analysis, Jones & Berlett Publishers. International London, 1996.
- 11) L. V. Ahlfors, Complex Analysis, McGraw Hill, 1979.
- 12) S. Lang, Complex Analysis, Addison Wesley, 1977.1998.
- 13) D. Sarason, Complex Function Theory, Hindustan Book, Agency, Delhi, 1994.
- 14) Mark J. Ablowitz and A. S. Fokar, Complex variables: Introduction & Application, Cambridge University Press, South Asian Edition, 56.
- 15) E. Hille, Analytic Function Theory (2 Vols), Gonn & Co. 1959.
- 16) W. H. J. Fuchs, Topics in the Theory of Function of Complex Variable, D. Van Nostrand Co., 1967.
- 17) C. Carathedory, Theory of Functions (2 Vols), Chelsea Publishing Company, 1964.
- 18) M. Heins, Complex Function Theory, Academic Press, 1968.
- 19) S. Saks & A. Zygmund, Analytic Functions, Monografie, Matematyczne, 1952.
- 20) E. C. Titchmarsh, the Theory of Functions, Oxford University Press, London.
- 21) W. A. Veech, A Second Course in Complex Analysis, W. A. Benjamin, 1967.
- 22) Complex variables and Applications, Jams Ward Brown, Ruel V. Churchill, McGraw Hill International Edition (2009).
- 23) Dennis G. Zill, Patrick D. Shanhan Jones and Burtlett, A First Course in Complex Analysis with application (Second edition) Publisher (2010).
- 24) John Mathew and Howell, Complex Analysis for Mathematician and Engineers.
- 25) Functions of one complex variable - J.B.Conway, Springer Verlag International Students Edition, Narosa Publishing House, 1980.

Paper-IV (104) : TOPOLOGY –I

- Unit-I** : **Cardinal and Ordinal Numbers** : Equipotent sets, cardinal numbers, order types, ordinal numbers, Axiom of choice.
- Unit-II** : **Topological Spaces** : Definition and examples of topological spaces. Open sets and Limit points. Closed sets and closure. operators and neighbourhoods. Bases and Relative Topologies.
- Unit-III** : **Connectedness, Compactness and Continuity** : Connected sets and components, compact and countably compact spaces. Continuous functions. Homeomorphisms. Arcwise connectivity.
- Unit-IV** : **Separation and Countability Axioms** : T_0 , T_1 & T_2 spaces. T spaces and sequences. First and Second axiom spaces, separability.
- Unit-V** : **Separation and Countability Axioms (Contd.)** : Regular and normal spaces, Completely regular spaces.

References :

- (1) Foundations of General Topology by William J. Pervin. Publisher : Academic Press
- (2) Theory and Problems of Set Theory and Related Topics by Semour Lipshutz Publisher: Schaum Publishing Co., New York.
- (3) J.R. Munkres, Topology : A First Course Publishers Prentice Hall of India.
- (4) K.D.Joshi, Introduction to General Topology, Publisher , Wiley Eastern Ltd.
- (5) By R.S.Aggarwal A Text Book on Topology, Publisher : S.Chand & Company .
- (6) J.N. Sharma, General and Algebraic Topology, Krishna prakashan

Paper-V (105) : DIFFERENTIAL GEOMETRY (OPTIONAL)

- Unit-I** : Local Intrinsic properties of a surface, Definition of surface, curves on a surface, surfaces of Revolution, Helicoids, Metric, Direction Coefficients.
- Unit-II** : Families of curves, Isometric correspondence, Intrinsic properties, Geodesics, Canonical Geodesic Equation, Normal Properties, Geodesic Existence theorems, Geodesic parallels.
- Unit-III** : Geodesic curvature, Gauss-Bonnet Theorem, Gaussian Curvature, Surface of constant curvature, conformal mapping, Geodesic mapping.
- Unit-IV** : Review of tensor calculus, Vector spaces, the dual space, Tensor product of vector spaces, Transformation formulae, contraction special tensors, Inner product. Associated tensors Exterior Algebra.
- Unit-V** : Differential manifolds, Tangent vectors, Affine Tensors and Tensorial forms, Connexions, covariant differentiation, Absolute derivation of Tensorial forms, Tensor connexions.

References :

- (1) W.Klingenberg (Springer), A course in Differential Geometry
- (2) Weatherburn, C. Riemannian Geometry and Tensor Calculus
- (3) T. M. Karade, G.S. Khadekar, Maya S. Bendre, Lectures on General relativity, Sonu-Nilu publication.
- (4) "An Introduction to Differential Geometry", By T.J.Wilmore, Oxford University Press (1959)
- (5) D. Somasundaram, Differential Geometry a first course, Narosa Publishing House, 2008

Paper-V (106) : ADVANCED DISCRETE MATHEMATICS -I(OPTIONAL)

- Unit-I** : Formal Logic : Statements, symbolic representation and Tautologies. Quantifiers, Predicates and validity. Propositional logic.
- Unit-II** : Semigroups and Monoids : Definitions and examples of semigroups and monoids (including those pertaining to concatenation operation). Homomorphism of semigroups and monoids. Congruence relation and Quotient semigroups. Sub-semigroups and submonoids. Direct products. Basic Homomorphism theorem.
- Unit-III** : Lattice Theory : Lattices are partial ordered sets. Their properties. Lattices as algebraic systems. Sublattices. Direct products and Homomorphisms. Some special lattices, e.g. complete, complemented and distributive lattices.
- Unit-IV** : Boolean Algebras : Boolean algebra as a lattice. Various Boolean identities. The switching algebra examples. Subalgebras. Direct products and Homomorphisms. Joint irreducible elements.
- Unit-V** : Boolean Algebras (Continue) : Atoms and minterms. Boolean forms and their equivalence. Minterm Boolean forms. Sum of products. Canonical forms. Minimization of Boolean functions. Applications of Boolean algebra of switching theory . (Using AND, OR and NOT gates). The Karnaugh map method.

References :

- (1) J.P . Tremblay and R.Manohar , Discrete Mathematical Structure with Application to Computer Science, McGraw Hill Book Co. 1997.
- (2) Seymour Lipschutz, Finite Mathematics (International Edition 1983). McGraw Hill Book Company .
- (3) S . Wiitala, Discrete Mathematics - A Unified Approach, McGraw Hill Book Co.
- (4) J.L. Gersting : Mathematical Structure for Computer Science (3rd Edition), Computer Science Press, New York.
- (5) C.L.Liu, Elements of Discrete Mathematics, McGraw Hill Book Co.

M.SC. -I (SEMESTER-II)

Paper-VI (201) : MEASURE AND INTEGRATION THEORY

- Unit-I** : Lebesgue outer measure, measurable sets, Regularity, Measurable functions, Borel and Lebesgue measurability.
- Unit-II** : Integration of Non-negative function, the general integral, integration of series, Riemann and Lebesgue integrals.
- Unit-III** : The Four derivatives, continuous non-differentiable functions, functions of bounded variation, Lebesgue differentiation theorem, differentiation and integration.
- Unit-IV** : Measures and outer measures, Extension of a measure,
- Unit-V** : The L^p uniqueness of Extension, completion of a measure, measure spaces, integration with respect to a measure. spaces, convex functions, Jensen's inequality. Holder and Minkowski inequality. Completeness of L^p convergence in measure. Almost Uniform convergence.

References :

- (1) Bartle R.G ., The Elements of Integration, John Wiley & Sons, Inc.,New York, 1966.
- (2) G .de Barra, Measure Theory and Integration. Wiley Eastern Limited, 1981.
- (3) Halmos P.R. Measure Theory, Van Nostrand Princeton, 1950.
- (4) Hawkins T. G., Lebesgue' s Theory of Integration, its origins and Development, Chelsea, New York, 1979.
- (5) Inder K. Rana, An Introduction to Measure and Integration, Narosa Publishing House, Delhi, 1997.
- (6) Karade T .M., Salunke J.N., Lectures on Advanced Real Analysis, Sonu Nilu Publication, Nagpur, 2004.
- (7) Royden H.L., Real Analysis, Macmillan Pub. Co. Inc., 4th Edition,New York, 1993
- (8) P.K. Jain and V.K.Gupta, Leabegue Measure and integration, June-2010

Paper-VII (202) : ADVANCED LINEAR ALGEBRA AND FIELD THEORY

- Unit I** : Canonical forms: Eigen values and eigenvectors. The minimal polynomial, Diagonalizable and triangular operators, The Jordan form, The rational form.
- Unit II** : Quadratic forms, Linear transformation, Congruence of matrices, Reduction of real quadratic form, Canonical or Normal form of a real quadratic form, Signature and index of a real quadratic form, Sylvester's law of inertia, Definite and semi-definite real quadratic Forms, Hermitian forms.
- Unit III** : Algebraic extension of fields: Irreducible polynomials and Einstein criterion, Adjunction of roots, Algebraic extension, Algebraically closed fields.
- Unit IV** : Normal and separable extension: Splitting fields, Normal extension, multiple roots, finite fields, Separable extension.
- Unit V** : Galois theory and Applications: automorphism groups and fixed fields, Fundamental theorem of Galois theory, Fundamental theorem of algebra, Roots of unity and cyclotomic polynomials, Cyclic extension, Polynomials solvable by radicals, Symmetric functions, Ruler and compass constructions.

Reference:

- 1) I. N. Herstein, Topics in Algebra, Wiley Eastern Ltd., New Delhi, 1975.
- 2) M. Artin, Algebra, Prentice-Hall of India, 1991.
- 3) P.M. Cohn, Algebra, Vols. I, II & III, John Wiley & Sons, 1982, 1989, 1991.
- 4) N. Jacobson, Basic Algebra, Vols. I & II, W.H. Freeman, 1980.
- 5) S. Lang, Algebra, 3rd edition, Addison – Wesley, 1993.
- 6) I.S. Luthar and I.B.S. Passi, Algebra, Vol. I-Groups, Vol. II – Rings, Narosa Publishing House.
- 7) D.S. Malik, J.N. Mordenson, and M.K. Sen, Fundamentals of Abstract Algebra, McGraw-Hill, International Edition, 1997.
- 8) K.B. Datta, Matrix and Linear Algebra, Prentice Hall of India Pvt. Ltd., New Delhi, 2000.
- 9) S.K. Jain, A.Gunawadana and P.B. Bhattacharya, Basic Linear Algebra with MATLAB, Key College Publishing (Springer – Verlag), 2001.
- 10) S. Kumarsena, Linear Algebra, a Geometric Approach, Prentice Hall of India, 2000.
- 11) Vivek Sahai and Vikas Bist, Algebra, Narosa Publishing House, 1999.
- 12) I. Stewart, Galois Theory, 2nd Edition, Chapman and Hall, 1989.
- 13) J.P. Escofier, Galois Theory, GTM Vol.204, Springer, 2001.
- 14) T.Y. Lam, Lectures on Modules and Rings. GTM Vol.189, Springer Verlag, 1999.
- 15) D.S. Passman, A Course in Ring Theory, Wadsworth and Brooks/ Cole Advanced Books and Softwares, Pacific Groves, California, 1991.
- 16) J.A. Gallian, Contemporary Abstract Algebra, Narosa Publication.
- 17) A.R. Vashistha, Modern Algebra, Krishna Prakashan Media (P) Ltd.
- 18) V.K. Khanna and Bhambri, a Course in Abstract Algebra, Vikas Publication, House (P) Ltd. (2010).
- 19) John B. Fraleigh, a First Course in Abstract Algebra (Seventh Edition).
- 20) Abstract Algebra (Third Edition) By David S. Dummit, Richard M. Foote, Wiley India Edition.
- 21) Matrices by A.R. Vashistha and A. K. Vashistha (Krishna).
- 22) Basic Abstract Algebra by P.B. Bhattacharya, S.K. Jain, S.R. Nagpaul

Paper-VIII (203) : INTEGRAL EQUATIONS

- Unit I** : Definition of integral equations, Types of integral equations: Fredholm integral equations of the first and second kind, homogeneous Fredholm integral equations of the second kind, Volterra integral equations of first and second kind, Homogeneous Volterra integral equations of the second kind, special kinds of kernels, symmetric kernels, separable and degenerate kernels, Leibnitz rule, integral of integral equations, solved examples, Method of converting an initial value problem into integral equations, solved examples, method of converting a boundary value problems into a Fredholm integral equations. Solved examples.
- Unit II** : Eigen values and Eigen functions: (a) Solution of homogeneous Fredholm integral equations of the second kind with separable kernels, solved examples based on (a). (b) Solution of Fredholm integral equation of the second kind with separable kernels, Solved examples based on (b).
- Unit III** : Definition of iterated kernels or functions, definition of resolvent kernels or reciprocal kernel, solution of Fredholm integral equation of the second kind by successive substitutions, solution of Volterra integral equation of the second kind by successive substitutions, Neumann's series, some important theorems, determination of iterated kernels, determination of resolvent kernels for Fredholm integral equations, solution of Fredholm integral equation with the help of resolvent kernels, solution of Fredholm integral equations by method of successive approximation to find solutions up to third order. Solve examples.
- Unit IV** : Solution of Volterra integral equations of second kind, determination of resolvent kernels for Volterra integral equations, solution of Volterra integral equations with the help of the resolvent kernels, solved examples, Neumann's series, Method of successive approximation for solving Volterra integral equations of second kind, Volterra integral equations of first kind, solution of Volterra integral equations of the first kind, solved examples, some fundamental properties of Eigen values and Eigen functions for symmetric kernels.
- Unit V** : Applications of integral equations and Green's function to ordinary differential equations, definition of Green's functions, Important theorems, constructions of Green's functions, solved examples, solution of boundary value problems using Green's functions, solved examples, solution of boundary value problems using Green's functions, solved examples, the case of homogeneous and conditions of boundary value problems.

Reference books:

- 1) Integral equations by Shanti Swaroop, Shiv Raj Singh
- 2) Linear integral equation, Theory and techniques, Academic press, New York 1971
- 3) R.P. Kanwal, Linear Integral Equation, Theory and Techniques, Academic Press, N.Y. (1971).
- 4) S.G. Mikhlin, Linear Integral Equations, Hindustan Book Agency, (1960).
- 5) A.M. Viazvaz, A First Course in Integral Equations, World Scientific (1997).
- 6) L.I.G. Chambers, Integral Equation: A Short Course, International Text Book Company Ltd. (1976).
- 7) Larry Andrews, Bhimsen Shiramoggo, Integral Transform for Engineers, Prentice Hall of India (2003).
- 8) Integral equations and boundary value problems by M. D. Raisinghania, S. Chand publication

Paper-IX (204) : TOPOLOGY –II

- Unit-I** : Metric Spaces : Metric Spaces as topological spaces. Topological properties. Hilbert (e2) space. Frechet space. Space of continuous functions.
- Unit-II** : Complete Metric Spaces : Cauchy sequences, completions, Equivalent conditions, Baire Theorem.
- Unit-III** : Product Spaces : Finite Products, product invariant properties. Metric Products. Tichonov Topology, Tichonov Theorem.
- Unit-IV** : Function and Quotient Spaces : Topology of pointwise convergence. Topology of compact convergence. Quotient topology .
- Unit-V** : Metrization and Paracompactness : Urysohn’s metrization theorem, paracompact spaces, Nagata-Smirnov metrization theorem.

Reference Books :

- (1) S.R.Munkres, Topology: A First Course, Publisher : Prentice Hall of India.
- (2) K.D.Joshi Introduction to General Topology , Publishers : WileyEastern Ltd.
- (3) William J. Pervin Foundation of General Topology, Publisher: Academic Press.

Paper-X (205) : RIEMANNIAN GEOMETRY (OPTIONAL)

- Unit-I** : Riemannian metric, metric tensor , Christoffel symbol, christoffel symbol of first kind, second kind, properties of Christoffel symbols. Computations of Christoffel’s symbols for static and non-static spherically symmetric and R-W space-times ,transformation of Christoffel symbols, derivatives of tensor, absolute derivative. Covariant derivatives, divergence, gradient, Laplacian.
- Unit-II** : Parallel Vector Fields : Parallel vector field of constant magnitude, parallel displacement of covariant vector field, parallelism of a vector field of variable magnitude Geodesic : Differential equations of a geodesic, special co-ordinate system : Local cartesian, Riemannian co-ordinates, Normal co-ordinates, Geodesic normal co-ordinates.
- Unit-III** : Curvature Tensor : Covariant curvature tensor of Riemann tensor , curvature tensor in Riemannian co-ordinates, properties of curvature tensors, on a cyclic property, number of independent components of R.
- Unit-IV** : Ricci tensor, curvature invariant, Einstein tensor, Computations of Einstein’s tensor for static and non-static spherically symmetric and R-W space times, the Bianchi identity. Geodesic deviation : Equations of Geodesic deviation.
- Unit-V** : Riemannian curvature, space of constant curvature, flat space, tensor derivatives, dual tensors, intrinsic symmetries and killing vectors.

Reference Books :

- (1) T. M. Karade, G .S. Khadekar and Maya S.Bendre, Lectures on General Relativity Sonu Nilu Publication.
- (2) T .J.Willmore .An Introduction in Differential Geometry
- (3) J. L. Synge, Tensor Calculus – Schild.
- (4) C.E. Weatherburn, An introduction to Riemannian geometry and tensor calculus, Cambridge university press, (1963)
- (5) L.P. Eisenhard, Riemannian geometry, University press Princeton (1926)
- (6) J.A. Schouten, Ricci Calculus, Springer Verlag, Berlin
- (7) T.Y. Thomas, Concepts from tensor analysis and differential geometry, Academic press, New York
- (8) W. Boothby, Introduction to differentiable manifold and Riemannian geometry, Academic press, 1975
- (9) S. Kobayashi and K. Nomizu, Foundations of differential geometry, Vol. I and II Wiley Interscience publisher 1963 (Vol.I), 1969 (Vol. II)

Paper-X (206) : ADVANCED DISCRETE MATHEMATICS-II (OPTIONAL)

- Unit-I** : Graph Theory : Definition of (undirected) graphs, paths, circuits, cycles and subgraphs. Induced subgraphs. Degree of a vertex. Connectivity planar graphs and their properties. Trees, Euler formula for connected planar graphs. Complete and complete bipartite graphs. Kuratowski’s theorem (statement only) and its use.
- Unit-II** : Graph Theory (Continue): Spanning trees, cut sets, fundamental cut sets, and cycles. Minimal spanning trees and Kruskal’s algorithm. Matrix representations of graphs. Euler’s theorem on the existence of Eulerian paths and circuits. Directed graphs. Indegree and outdegree of a vertex. Weighted undirected graphs. Dijkstra’s algorithm. Strong connectivity and Warshall’s algorithm. Directed trees. Search trees. Tree traversals.

Unit-III : Introductory Computability Theory : Finite state machines and their transition table diagrams. Equivalence of finite state machines. Reduced machines. Homomorphism. Finite automata acceptors. Non-deterministic finite automata and equivalence of its power to that of deterministic finite automata. Moore and Mealy machines.

Unit-IV : Grammers and Languages:Phrase structure grammars. Rewriting rules, Derivations, sentential forms. Language generated by a grammer . Regular , context free and context sensitive grammers and languages. Regular sets, regular expressions and the pumping lemma. Kleen' s theorem.

Unit-V : Turing machine and partial recursive functions. notation. Notions of syntax analysis, polish notations. Conversion of infix expressions to polish notations. The reverse polish

References :

- (1) N.Deo, Graph Theory with Applications to Engineering and Computer Sciences, Prentice Hall of India.
- (2) J.R.Tremblay and R. Manohar , Discrete Mathematical Structure with Application to Computer Science, McGraw Hill Book Co., 1997.
- (3) J.E. Hopcroft and J.D.Ullman, Introduction to Automata Theory , Language and Computation, Narosa Publishing House.
- (4) C.L. Liu, Elements of Discrete Mathematics, McGraw Hill Books co.
- (5) F.H. Harary - Graph Theory , Narosa Publishers, New Delhi (1989)
- (6) K.R.Parthasarthy , Basic Graph Theory (TMH)

NOTIFICATION

No. : 55/ 2015

Date: 18/06/2015

Subject : Continuation of Prospectus No.2013126 prescribed for M.Sc.Part-I & II (Botany) for the Session 2015-16.

It is notified for general information of all concerned that the Prospectus of M.Sc.Part-I & II (Sem-I to IV) bearing No.2013126 prescribed for the Academic Session 2014-15 shall continue for the session 2015-16 along with the following addition of books as reference books.

Sr. No.	Name of the Book/Publisher	Name of Author	Book be added in the list of
1	Trees of Vidarbha (A field guide to flowering trees)	Dr. M.M. Dhore Sh. P.S. Lachure Sh. P.D. Gawande	Reference book for M.Sc.-II, Sem-III for the Paper-X Taxonomy & Angiosperms on page no. 31 at sr.no.20.

Sd/-
 Registrar
 Sant Gadge Baba Amravati University

NOTIFICATION

No. : 56/ 2015

Date: 18/06/2015

Subject : Continuation of Prospectus No.2014128 prescribed for M.Sc.Part-I & II (Microbiology) for the Session 2015-16.

It is notified for general information of all concerned that the Prospectus of M.Sc.Part-I & II (Microbiology) (Sem-I to IV) bearing No.2014128 prescribed for the Academic Session 2014-15 shall continue for the session 2015-16 along with the following addition of books as reference books.

Sr. No.	Name of the Book/Publisher	Name of Author	Book be added in the list of
1	General Enzymology, Kulkarni and Deshpande, Himalaya Publishing House.	Kulkarni and Deshpande.	Reference book for M.Sc.-I, Sem-I for the subject Microbiology on page no.26 at sr.no.126
2	Modern Approaches to Soil & Agriculture and Environmental Microbiology, Himalaya Publishing House.	Shiva Aithal & Nikhilesh Kulkarni.	Reference book for M.Sc. Sem-I & II for the subject Microbiology on page no 26 at sr.no.127.

Sd/-
 Registrar
 Sant Gadge Baba Amravati University

NOTIFICATION

No. : 57/2015

Date: 18/06/2015

Subject : Continuation of Prospectus No.2015127 prescribed for M.Sc.Part-I & II (Sem-I to IV) (Zoology) for the Session 2015-16.

It is notified for general information of all concerned that the Prospectus of M.Sc.Part-I & II (Sem-I to IV) (Zoology) bearing No.2015127 prescribed for the Academic Session 2014-15 shall continue for the session 2015-16 along with the addition of special note given in **Appendix-A** and substitution of practical syllabi as given in **Appendix-B** appended with this notification.

Sd/-
Registrar
Sant Gadge Baba Amravati University

Appendix-A

D) Following special note be added on page No.2, in the Prospectus No.2015127 prescribed for M.Sc.Part-I & II (Sem-I to IV) (Zoology) after “List of papers”:

Special Note :

- i) Use of animals for practical purpose in this curriculum is subject to the conditions, under the Wild Life (Protection) Act 1972 and should abide by the prevention of cruelty to animals Act 1960. No any scheduled animal species should be used in the laboratory.
- ii) The research based project on animals should strictly abide by the rule as mentioned in para-6 of U.G.C. Notification No.F.14-6/2014 (CPP-II), dated 1st August, 2014, which state that –
 - 6.1 All institutions of Higher Education shall constitute “Dissection Monitoring Committees” (DMC) to ensure strict compliance of instructions relating to the use of animals for research purposes only;
 - 6.2 The Head of the concerned department shall be the Convener and Chairperson of DMC. Two Senior faculty members of the concerned department, one faculty member of a related department from the same institution and one or two Faculty members of the concerned department from the neighboring institution(s) shall be members of DMC.
 - 6.3 The tenure of DMC shall be two years and on expiry of a term, the DMC should be reconstituted wherein only the Convener and Chairperson (The Head of the Department) may continue for two or more terms if he/she happens to continue to be the Head of the Department. A vacancy arising during the tenure of DMC shall be filled with a faculty belonging to the respective category. The quorum for the meeting shall be 3 out of 6, where in at least one member from the neighboring institution must be present. The DMC shall meet at least once each semester/ half year and approve/review alternative experimentation of animals for laboratory exercises.
 - 6.4 It shall be the responsibility of the DMC to ensure that animals that are permitted to be used for dissections / experiments in the instructions herein are procured from ethical sources, and not removed from the wild, transported to the laboratory without stress or strain to the animals, if live, and anaesthetized appropriately if they are to be used in dissections.
 - 6.5 The DMC shall ensure that the institution maintains appropriate records of procurement of animals, their transport, number of animals used, use of anesthesia/euthanasia etc.
 - 6.6 The DMC shall be different from the Institutional Animal Ethics Committee (IAEC), under the purview of Committee for purpose of care and supervision of experimental animals (CPCSEA), Department of Environment and Forest, Govt. of India. However, the DMC shall not have powers to over-riding the powers of IAEC. For animals covered by the IAEC, with standard operating procedures (SOPS) for IAECs prescribed by CPCSEA will apply.
- iii) Those Institutions which are already having Zoology museums should not procure museum specimens now onwards and should use charts / slides / models / photographs and digital alternatives in case of need. Those new institutions which are not having Zoology museum in their department should provide learning related to zoological specimens with the help of charts / slides / models / photographs and digital alternatives / and arrange visit of students to already established museums.

II) The Practical's 1 to 7 mentioned in Prospectus No.2015127 prescribed for M.Sc.Part-I & II (Sem-I to IV) (Zoology) be substituted by the following Practical's 1 to 7 :

Practical-1 : (Based on paper I and II)

A) Anatomy of Different Systems by demonstration and labelling with available resources like C.D./chart/ models/ Video clippings/ PPT/ Preserved dissected specimens etc.

Earth worm/Cockroach/Prawn, / a major carp fish/ Rat/mouse /rabbit or similar non-chordate and chordate available animals.

B) Mounting / Stained permanent preparations:-

- i. Conjugation and binary fission in *Paramecium*
- ii. *Vorticella*, *Euglena*
- iii. Rotifers from fresh water
- iv. Setae, Nephridium, .Ovary and spermatheca of Earthworm.
- v. Mouth parts and internal organs of mosquito- honey bee, house fly or any pest /vector insect.
- vi. Wings of small insects (Mosquito, Drosophila, house fly)
- vii. Halteres and Leg showing pulvillus in insects.
- viii. Fish scales from major carps.

C) Photographic collection and Comments on campus/local faunal diversity with reference to their ecology.

1. Earthworms used in vermiculture (any three species)
2. Any three species of Cockroaches.
3. Any 5 butterfly species
4. Any 5 moth species
5. Any five dragonfly species
6. Local Freshwater fish species any 10 with fin formulae
7. Any three amphibians.
8. Any five snake species
9. 10 common Birds
10. Any five migratory birds
11. Deers and antelopes.

D.

- i. Qualitative and Quantitative estimation of Zooplankton communities.
- ii. Identification of genera & sex, of local mosquitoes, house flies,
- iii. Measurement and camera Lucida drawings of microscopic objects.
- iv. Hair impressions: cat, dog, rabbit, buffalo, human beings etc

E) Museum Study:-

Taxonomy of animal specimens/charts / photographs/ models/ video clipping available in the laboratory representing major orders of Nonchordata, Protochordata, and vertebrata, other than studied in previous courses.

F) Study of available Permanent stained slides/ ICT based sources:

Whole mount of Larval forms : Planula,Redia,Cercaria,Cysticercus, bladder worm, Trochophore, Nauplius, Zoea, Mysis Phyllosoma, Antilon, Veliger, Bipinnaria, Ophio and Echinopluteus, Auricularia, Tornaria.

Mammalian Histology; Skin, bone, regions of alimentary canal, digestive glands, trachea, lung, kidney. Spinal cord, gonads, Endocrine glands.

G) Comparative Osteology (Excluding loose bones of skull):

Amphibia, Reptilia; Aves, mammals.(with available skeleton or ICT based alternatives).

H) Culture/rearing of earthworm/ cockroach/silkworm/drosophila/any crop pests.

Note : Study tour/frequent field visits, for Observations of animals in their natural habitat should be arranged.

Candidates shall be required to produce at the practical examination the Followings-

1. Practical Record Book duly signed by the teacher in-charge and certified by the Head of the Department as the bonafide work of the candidate.
2. 10 permanent stained micro- preparations prepared by the examinee.
3. A report of study tour/field visit duly signed by teacher in charge.

The duration of the practical examination will be of six hours and the distribution of marks are as follows.

Q.1 Hands on experiments	
i. Diagrammatic representation of the anatomy of the given system of Non-chordate / Chordate.	10 marks
ii. Practical based on part D	15 marks
iii. Stained permanent preparations based on part B	10 marks
Q.2 Identification and comments on 10 spots. two marks each (Specimens, slides, bones,)	20 marks
Q.3 Identification and Comments on the given Campus/local fauna based on part C (any two)	10 marks
Q.4 Submission of stained permanent preparations	10 marks
Q.5 Submission of the report of study tour/field visits	05 marks
Q.6 Practical record	10 marks
Q.7 <i>Viva Voce</i>	10 marks

Total 100 marks

Practical-2, based on Paper - III and – IV :

1. Elementary idea of animal ethics in laboratories.
2. Morphology and histology of non-chordate and chordate ovary and testis (Insects, snails, frog and rat) / alternative available resources.
3. Oogenesis and spermatogenesis through gonad histological preparation (A major carp Fish, Poultry, Goat/Sheep).
4. Study of different types of eggs on the basis of their yolk content.
5. Observation of frog and toad spawn embryos and larvae up to metamorphosis and study of stages of development
6. Study of cleavages in limnea in laboratory.
7. Mounting of larvae of *Limnea/Bellamia*.
8. Study of development of *Amphioxus*, Frog, Chick and pig through available slides of whole mounts/ available ICT based alternatives.
9. Morphogenesis and growth study of chick development.
10. Sperm count.
11. Abnormal sperm count.
12. Semen analysis (Fructose Estimation).
13. Study of different types of cells present in bone marrow.
14. Bio-assay of LH by OAAD test
15. Bioassay of estrogen using uterotrophic vaginal response or Analysis of ovarian / adrenal lipids by TLC
16. Oocyte maturation in major carp fish using germinal vesicle breakdown test by the induction of maturation-inducing steroid.

The examinee shall be required to produce at the practical examination the following: Practical record book duly signed by teacher in charge and certified by the Head of the Department as a bonafide work of the examinees.

Note: Besides these any other additional experiment relevant to the syllabi depending on resources

Distribution of Marks : The practical shall be of six hours duration & distribution of marks will be as follows:

- | | |
|--|------------|
| 1. Mounting: Chick embryo / Molluscan larvae or Developmental stages | : 15 marks |
| 2. Identification of spots | : 20 marks |
| 3. Estimation / histological preparation/ Bioassay. | : 20 marks |
| 4. Sperm count / slide of bone marrow; | : 20 marks |
| 5. Practical record | : 10 marks |
| 6. Viva voce | : 15 marks |

Total 100 marks

Practical-3 based on papers V and VI :

1. Organelle separation by centrifugation
2. Electrophoretic separation and Determination of molecular weights of proteins by SDS-PAGE.
3. Light microscopic demonstration of Plasma membrane. (Oil red O, Sudan black B)
4. Demonstration of mitochondria by vital staining.
5. Histochemical demonstration of extracellular matrix. (glycoproteins- Alcian blue pH 1,2.5, PAS)
6. Histochemical demonstration of Lysosomes by demonstrating acid phosphatase activity.
7. Histochemical demonstration of DNA by Feulgen technique.
8. Histochemical demonstration of DNA & RNA by MGPY technique.
9. Preparation of different cell types.
10. Media preparation for prokaryotic cell culture.
11. Different methods of sterilization (Dry, wet and UV sterilization)
12. *E.coli* culturing.
13. Gram staining of micro-organisms
14. Cell viability testing.
15. Preparation of tissue sections & light microscopic examination.
16. Uses of different microscopes.
17. Absorption spectrum of any coloured solution of a substance.
18. Separation of Amino Acids by paper chromatography.

Candidates shall be required to produce at the practical examination, the following : Practical Record Book duly signed by the teacher in-charge and certified by the Head of the Department as the bonafide work of the candidate.

Note: Besides these any other additional experiment relevant to the syllabi depending on resources

Distribution of Marks for Practical –3 : The practical shall be of duration of 6 hours and distribution of marks will be done as below-

1. Histochemical/Cytological demonstration. : 25 marks
2. Absorption Spectrum of any coloured solution/
Microbiological Preparation : 25 marks
3. Chromatography/electrophoresis : 25 marks
4. Class record : 10 marks
5. *Viva voce* : 15 marks

Total : 100 marks

Practical -4 Based on paper VII and VIII:

Total: 100 marks

1. Chart/ Photographic based study of human hormonal disorders.
2. Anatomy and Histology of:
 - a. vertebrate (Poultry/sheep/major carp) endocrine glands.
 - b. Insect Pests /Vector neuroendocrine structures .
3. Water analysis of different samples (Pond/Pool water, Canal/River water, Sewage water);
 - i. total hardness
 - ii. Nitrate contents.
 - iii. Sulphate contents.
 - iv. Fluoride contents o different samples of water.
 - v. Total Alkalinity
 - vi. DO
 - vii. Free CO₂
4. Soil analysis of Different samples (**Clayey soil, Sandy soil, Garden soil / Red soil**)
 - i. Soil Moisture ,
 - ii. Chlorides,
 - iii. Sulphates.
 - iv. Nitrates,
 - v. Total Phosphates ,
 - vi. Total organic matter,
 - vii. Humus
5. Instrumentation AAS/ HPLC for residue analyses of toxicant (demonstration)
6. Biodiversity Inventories/Surveys and Field Techniques, Pitfall traps, transect line etc
7. Calculation of Diversity indices (Similarity, Shannon, Simpson)
8. Biological responses of animals to various osmotic concentrations and their effects.
 - a. Change in weight of Earthworm in mild heteroosmotic media.
 - b. Active uptake of Na⁺ and Cl⁻ of aquarium fish from the environmental water and change in salinity.
9. Rate of oxygen consumption by aquatic/terrestrial animals under various Environmental stresses.
10. Determination of respiratory quotient of an air breathing animal at different Temperatures.
11. Measurement of frequency, density and diversity of invertebrates in college campus
12. Identification of Freshwater Plankton from the slides.
13. Qualitative analysis of organisms (Pollution indicator) such as diatoms / algae, flagellates, ciliates, Rotifers and larvae of insects.
14. Research work based study of;
 - a. Effect (microphotograph) of environmental toxicants on histoarchitecture of mammalian
 - i. Kidneys.
 - ii. Liver,
 - iii. Gonads
 - iv. Endocrine glands.
 - b. Effect of environmental toxicants on various blood and tissue biochemical in mammals.

Note: Besides these any other additional experiment relevant to the syllabi depending on resources

Candidates shall be required to produce at the practical examination, the Following-

Practical Record Book duly signed by the teacher in-charge and certified By the Head of the Department as the bonafide work of the candidate.

The practical shall be six hours duration and distribution of Marks will be as follows:

1. Histological preparation : 25 marks
2. Water Analysis : 15 marks
3. Soil Analysis : 20 marks
4. Plankton analysis/comments on research based environmental toxicity
/two hormonal disorders/biodiversity study : 15 marks
5. Class record : 10 marks
6. *viva voce* : 15 mark

Total 100 marks

Practical-5 based on Paper – IX and X (Molecular Cytogenetic) :

- 1) Demonstration of Barr bodies in leucocytes of human female
- 2) Demonstration of salivary gland chromosomes from *Chironomous /Drosophila Larvae*
- 3) Study of mitosis in cleaving eggs of Frog / any invertebrate
- 4) Study of meiosis from Grasshopper testis using smear method
- 5) Histological demonstration of meiosis in Rat testis (Photo / Slide)
- 6) Preparation of human karyotype by using photograph/picture
- 7) Culture of *Drosophila* and study of life cycle and sexual polymorphism
- 8) Identification of wing and eye mutants in *Drosophila*
- 9) Extraction of DNA
- 10) Estimation of DNA (spectrophotometric)
- 11) Extraction of RNA
- 12) Estimation of RNA (spectrophotometric)
- 13) Problems on Genetics based on dihybrid crosses, sex-linked inheritance and blood Groups
- 14) Study of various human genetic traits.

Note : Besides these any other additional experiment relevant to the syllabi depending on resources.

The examinee shall be required to produce at the practical examination the Following:

1. Practical record book duly signed by teacher in charge and certified by the Head of the Department as a bona fide work of the examinees.

Distribution of Marks:

The practical shall be of six hours duration & distribution of Marks will be as follows:

- | | |
|-----------------------------------|-------------|
| 1. Estimation / Experiment | : 30 marks |
| 2. Cytological Preparation | : 25 marks |
| 3. Problems on Genetics (any two) | : 20 marks |
| Total | : 100 marks |
| 4. Class Record | : 10 marks |
| 5. <i>Viva Voce</i> | : 15 marks |

Total : 100 marks

Practical-6 : Based on Paper XI and XII (Molecular Biology – I & II)

1. DNA fingerprinting.
2. Extraction of DNA from bacteria.
3. Extraction of DNA from yeast.
4. Extraction of DNA from animal tissue.
5. Extraction of DNA from whole blood.
6. Determination of molecular size of DNA.
7. Restriction digestion.
8. Demonstration of plasmids in the gel by gel electrophoresis.
9. Isolation and cleaning the DNA fragment of interest from the agarose gel.
10. DNA transformation into bacterial cells.
11. Estimation of total proteins from Serum.
12. Screening of antigen and antibody (screening test in antibody production (Ouchterlony Double Diffusion).
13. Estimation of antigen and antibody content in the samples by quantitative Precipitation assay.
14. Estimation of antigen and antibody content in the samples by Radial Immunodiffusion.
15. Counter - current immunoelectrophoresis.
16. Dot ELISA.
17. Separation of immunological proteins (alpha, beta, gamma) by paper or gel electrophoresis.

Note: Besides these any other additional experiment relevant to the syllabi depending on resources

The examinee shall be required to produce at the practical examination the following :

Practical record book duly signed by teacher in charge and certified by the Head of the Department as a bona fide work of the examinees.

The practical shall be spread over a period of two days (six hours each) & distribution of marks will be as follows.

Distribution of Marks :

- | | |
|---|------------|
| 1. DNA Electrophoresis based experiment | : 25 marks |
| 2. DNA Extraction based experiment | : 25 marks |
| 3. Estimation | : 25 marks |
| 4. Certified Practical record book | : 10 marks |
| 5. <i>Viva voce</i> | : 15 marks |

Total : 100 marks

Practical -6 based on elective (Entomology) papers XI and XII:

1. Culture / Rearing of Cocroach/Crecket/Grasshopper/Drosophila/Silkworm.
2. Study of Orders of insects and their identification using taxonomic keys.
3. Keying out families of insects of different major Orders: Odonata, Orthoptera, Blattodea, Mantodea, Isoptera, Hemiptera, Thysanoptera, Phthiraptera, Neuroptera, Coleoptera, Diptera, Lepidoptera and Hymenoptera.
4. Field visits for observation and photographic collection of insects of different orders.
5. Study of insect segmentation, various tagmata and their appendages;
6. Preparation of permanent mounts of different body parts and their appendages of taxonomic importance including male and female genitalia.
7. Sense organs.
8. Anatomy of harmful and rearable insects.
9. Preparation of permanent mounts of internal systems;
10. Chromatographic analysis of free amino acids of haemolymph;
11. Determination of chitin in insect cuticle;
12. Examination and counting of insect haemocytes;
13. Determination of respiratory quotient;
14. Preparation and evaluation of various diets;
15. Consumption, utilization and digestion of natural and artificial diets.
 Qualitative survey of digestive enzymes in salivary glands.
 Qualitative survey of digestive enzymes in gut.
 Estimation of total proteins/carbohydrates/lipids in haemolymph/tissues.
 Detection of uric acid as end product of excretion in terrestrial insects.
 Separation of haemolymph proteins by electrophoresis.
 Estimation of Na⁺ & K⁺ in haemolymph by flame photometer.
 Estimation of DNA and RNA in Haemocytes/tissues.

Note:

- 1) Besides these any other additional experiment relevant to the syllabi depending on resources
- 2) Student should submit photographs of local insects, 10 morphological and 10 histological slide preparations at the time of practical examination.

The practical shall be of six hours duration & distribution of marks will be as follows.

Distribution of Marks :

Full Marks: 100

1. Anatomy of the given insect.	15
2. Comments on	10
3. Physiology Experiment	20
4. Permanent stained preparation.	20
5. Identification of Morphological & Histological spots (ten)	10
6. Practical Record and Insect Photographic Collection	10
7. Viva Voce	15

Total 100

Practical 6 based on Elective Paper - Animal Physiology I and II

1. Estimation of serum creatinine.
2. Estimation of serum urea.
3. Qualitative analysis of urea
4. Quantitative estimation of calcium, phosphorus sodium and potassium.
5. Separation and identification of amino acids by thin layer chromatography.
6. Experiments on Blood.
 - 6.1 Determination of Erythrocyte sedimentation rate (E.S.R.)
 - 6.2 Determination of pack cell volume (P.C.V).
 - 6.3 Determination of mean corpuscular volume (M.V.C.)
 - 6.4 Detection of blood by hemin crystals test.
 - 6.5 Estimation of protein.
 - 6.6 Estimation of glucose.
 - 6.7 Estimation of cholesterol.
7. Study of estrus cycle in vaginal smear in female rat / photographic study.
8. Estimation of genomic DNA from major carp fish/ goat /poultry.
9. Agarose gel electrophoresis of DNA.

Note: Besides these any other additional experiment relevant to the syllabi depending on resources

The practical shall be of 6 hours duration and distribution of marks will be as follows-

Distribution of marks for practical physiology :		Marks
1	Major physiology experiments.....	30
2	Minor physiology experiments.....	20
3	Experiment on blood.....	25
4	Class record.....	10
5	<i>Viva voce</i>	15
Total :		100 Marks

Suggested Reading Materials: (All recent editions): Provided with Papers XV and XVI

Practical-6 based on Paper- XI (Elective paper) Fisheries-I Fish Nutrition, Capture and Culture Fishery, Fisheries Paper- XII (Elective paper) Fisheries-II Fish Physiology

1. Experiments on Water Analysis

Estimation of Dissolved gases, Dissolved Oxygen, Free Carbon dioxide, Estimation of Dissolved Solids, Chlorides, Carbonate, Bicarbonate, Total Alkalinity, Total hardness, Nitrites, Nitrates, Ammonia, Phosphates, Estimation of Biological Oxygen Demand, Estimation of Chemical Oxygen Demand, Estimation of Primary productivity of any local pond, river, lake or reservoir.

2. Plankton Analysis

Collection, preservation and estimation of planktons, Quantitative analysis- Enumeration of Zooplanktons by i) drop count method ii) Sedgwick Rafter Cell method/ Preparation of Diversity indices, Population density, Determination of dominance of the species.

3. Observation & photographic Collection, identification and classification of Locally available fishes, prawns, lobsters and mollusks of economic importance.
4. Observation & photographic Collection and Identification of common aquatic insects/ aquatic weeds
5. Permanent micro preparation of different kinds of scales in fishes.
6. Anatomy of major carp fishes: Digestive, Reproductive Nervous system Brain, Cranial nerves Pituitary, in carps, Nervous system in edible Prawns available in market.
7. Formulation and processing of feeds,
8. Collection and Identification of major carp spawn and fry.
9. Construction and Maintenance of Aquarium
10. Preparation of models and designing of cages and pens Visit to Fish farm.
11. Fish pathology- Study of fish parasites and diseases, pathological experiments
12. Fish physiology experiments- Digestive enzymes, biochemical composition

Note: Besides these any other additional experiment relevant to the syllabi depending on resources

Candidates shall be required to produce at the practical examination the Following :

1. Practical Record Book duly signed by the teacher in-charge and certified by the Head of the Department as the bonafide work of the candidate.
2. Permanent stained micro- preparations prepared by the examinee.
3. Photographic Collection of the specimens
4. Study tour diary.

Distribution of Marks for practical - I

1)	Anatomy of given system of major carp:	15 marks
2)	Plankton analysis	10 marks
3)	Experiment based on, water analysis/Fish pathology	10 marks
4)	Identification and comments on spots (05) (or available alternatives) (Fishes, Crustaceans, Aquatic Insects, Aquatic weeds, Zooplanktons)	20 marks
5)	Permanent micro preparation	10 marks
6)	Submission of Permanent slides and specimen Photographs	10 marks
7)	Practical record	10 marks
8)	Submission of study tour report	05 marks
9)	<i>Viva voce</i>	10 marks

Total : 100 marks

Practical -7 : Based on papers XIII and XIV and elective paper XV and XVI (mentioned in the concern syllabi)

- 1) Determination of isoelectric pH amino acids.
- 2) Isolation of casein from milk
- 3) Study effect of pH and temperature on enzyme activity. Ex. Salivary amylase.
- 4) To study the effect of inhibitors on enzyme activity.
- 5) Determination of acid value of fat.
- 6) Estimation of plasma / serum glucose
- 7) Estimation of glycogen from tissue.
- 8) Estimation of serum cholesterol
- 9) Estimation of phospholipids
- 10) Estimation of lactate dehydrogenase

- 11) Estimation of total proteins from Serum.
- 12) Estimation of Na/K ions.
- 13) Estimation of calcium
- 14) Estimation of ATPase
- 15) Estimation of SGOT / SGPT
- 16) Estimation of Acetylcholinesterase
- 17) Estimation of acid / alkaline phosphatase
- 18) Estimation of catalases
- 19) Estimation of superoxide dismutase.
- 20) Examples from Biostatistics as per theory
- 21) Drawing graphs and tables on computer.

Note : Besides these any other additional experiment relevant to the syllabi depending on resources

Candidates shall be required to produce at the practical examination, the following-

Practical Record Book duly signed by the teacher in-charge and certified by the Head of the Department as the bonafide work of the candidate.

The practical shall be of six hours duration and distribution of marks will be as follows:

Distribution of Marks: Based on papers XIII and XIV and elective groups paper XV and XVI

1) Estimation /experiment	30
2) From elective paper (Estimation / experiment)	20
3) Example / Experiment /slide / computer based practical	25
4) Class Record, collection, slides (as per syllabus)	10
5) <i>Viva-Voce</i>	15

=====
Total : 100

Practical to be carried out in practical No. 7 based on Molecular Biology Elective Paper-III & IV :

1. Identification of blood groups - A, B, AB, O and Rh.
2. Screening of antigen and antibody by Ouchterlony double diffusion.
3. Estimation of antibody concentration in the samples by quantitative precipitin assay.
4. Estimation of antigen concentration in the samples by radial immunodiffusion.
5. Counter-current immunoelectrophoresis.
6. Dot – Elisa.
7. Separation of immunological proteins (alpha, beta, gamma) by polyacrylamide gel electrophoresis.

Note: Besides these any other additional experiment relevant to the syllabi depending on resources

List of Practical : To be carried with the practical-7 based on Entomology Elective Paper-III & IV :

1. Types of immature stages of crop pests, household pests, vector insects, their collection, rearing and preservation.
2. Photographic identification of immature insects to orders and families, in endopterygote orders viz., Diptera, Lepidoptera, Hymenoptera and Coleoptera using key.
3. Identification of species of mosquitoes, houseflies, honey bees, and their special adaptations,
4. Identification and handling of bee-keeping equipment's.
5. Anatomy of honey bees/silk worm/similar rearable insects.
6. Visit to bee nursery and commercial apiaries.
7. Silkworm rearing and management in laboratory.
8. Anatomy of larval and adult silk moths.
9. Lac host and crop management technology and processing of lac. Products and bye-products of lac.
10. Photographic collection and identification of important pests and their natural Enemies; detection and estimation of infestation and losses in different crops; study of life history of important insect pests.
11. Assessing pest status in dwellings (labs, canteen or hostel), implementation of pest control against flies, mosquitoes, bed bugs, cockroaches.
12. Control of silverfishes in the library.
13. Visit to poultry units and assessing pest status in poultries..
14. Laboratory and field evaluation of bioefficacy of insecticides; Bioassay techniques; porbit analysis; evaluation of insecticide toxicity and joint action. (Research based study)
15. Visits (only where logistically feasible) to bio-control laboratories to learn rearing and mass production of egg, egg-larval, larval, larval-pupal and pupal parasitoids, common predators, microbes and their laboratory hosts, phytophagous natural enemies of weeds.
16. Field observation of parasitoids and predators.
17. Hands-on training in culturing, identification of common insect pathogens.

Note: Besides these any other additional experiment relevant to the syllabi depending on resources.

Practical to be carried with the practical 7: Based on Animal Physiology XV and XVI

1. Properties of saliva. Isolation and identification of micro organisms in saliva.
2. Estimation of blood ammonia/urea under various physiological conditions.
3. Estimation of constituents of urine.
4. Microscopic examination of urine.
5. Preparation and examination of blood smear to study blood cells.
6. Differential leucocytes count.
7. Histochemical demonstration of-
 - Carbohydrates.
 - Proteins.
 - Lipids.
 - Acid and alkaline phosphatase.
8. Separation of proteins by gel electrophoresis.
9. Qualitative analysis of ketone bodies and salts.

Note: Besides these any other additional experiment relevant. to the syllabi depending on resources

Practicals to be carried out along with Practical-7, Based on –Paper- XV (Elective paper) Fisheries-III Fish Harvest and Post Harvest Technology Paper- XVI (Elective paper) Fisheries-IV Fish Reproductive physiology and pathology

1. Study of gonadal development in major carps and other cultivable fishes.
2. Induced breeding of fishes through various inducing agents.
3. Evaluation of carp milt and egg.
4. Determination of age of fish by scale reading.
5. Study of length weight relationship in fish.
6. Morphometric study of given carp fish.
7. Exercises on Hardy-Weinberg equation.
8. Isolation of DNA from fish blood
9. Photographic collection, identification and isolation of live food organisms using various techniques
10. Preparation of various culture media
11. Mass culture of cladocerans, copepods and rotifers.

NOTIFICATION

No. : 58/ 2015

Date : 18/06/2015

Subject: Additional chances to the failure students of B.Sc. Semester-I to VI (Mathematics) and M.Sc. Semester-I to IV (Mathematics) old syllabi.

It is notified for general information of all concerned that the authorities of the University have decided to provide two additional chances to the failure students of B.Sc. Semester-I to VI (Mathematics) & M.Sc. Semester-I to IV (Mathematics) old syllabi in the light of the syllabi of the said paper has been changed from the session 2015-16 & onwards. The chances shall be applicable to the failures as mentioned in the following table.

T A B L E

Sr. No.	Name of the Exam.	New Syllabi of the subject Mathematics to be implemented from	Chances provided for the Subject Mathematics
1	B.Sc. Sem. I	Winter- 2015	Winter-2015, Summer-2016
2.	B.Sc. Sem. II	Summer-2016	Summer-2016, Winter-2016
3.	B.Sc. Sem. III	Winter- 2016	Winter-2016, Summer-2017
4.	B.Sc. Sem. IV	Summer-2017	Summer-2017, Winter-2017
5.	B.Sc. Sem. V	Winter-2017	Winter-2017, Summer-2018
6.	B.Sc. Sem. VI	Summer-2018	Summer-2018, Winter 2018
7.	M.Sc. Sem-I	Winter- 2015	Winter-2015, Summer-2016
8.	M.Sc. Sem-II	Summer- 2016	Summer-2016, Winter-2016
9.	M.Sc. Sem-III	Winter- 2016	Winter-2016, Summer-2017
10.	M.Sc. Sem-IV	Summer- 2017	Summer-2017, Winter-2017

Sd/-
 Registrar,
 Sant Gadge Baba Amravati University,
 Amravati

NOTIFICATION

No. : 59/ 2015

Date : 18/06/2015

Subject : Additional Chances for failure students of B.Pharm. Final (M.U.H.S. Course).

Reference : Notification No.92/2012, dt.5.7.2012

It is notified for general information of all concerned that the authorities of the University have provided the additional chances up to Summer-2016 examination for failure students of B.Pharm. Final (M.U.H.S. Course).

Sd/-
Registrar,
Sant Gadge Baba Amravati University,
Amravati

NOTIFICATION

No. : 60/ 2015

Date : 18/06/2015

Subject : ADDITIONAL CHANCES FOR FAILURE STUDENTS OF B.PHARM. PART-I TO FINAL (ANUAL PATTERN) (OLD COURSE).

Reference: 1) Notification No.149/2012, dt.25.10.2012
2) Notification No.47/2014, dt.24.4.2014

It is notified for general information of all concerned that the authorities of the University have provided the additional chances upto Summer-2016 for failure students of B.Pharm. Part-I to Final (Annual Pattern-Old Course)

Sd/-
Registrar,
Sant Gadge Baba Amravati University,
Amravati

NOTIFICATION

No. : 61/ 2015

Date : 18/06/2015

Subject : Regarding B.SC. (Home Science) (Annual Pattern) and M.Sc. (Home Science) (Annual Pattern) (All Specializations).

Reference: 1) Notification No.113/2010, dt.29.7.2010
2) Notification No.75/2011, dt.9.6.2011
3) Notification No.76/2011, dt.9.6.2011
4) Notification No.9/2012, dt.19.1.2012
5) Notification No.42/2012, dt.12.4.2012
6) Notification No.25/2013, dt.21.3.2013
7) Notification No.45/2013, dt.9.5.2013
8) Notification No.50/2014, dt.24.4.2014

As per decision of the authorities failure students of old course of B.Sc. (Home Science) (Annual Pattern) and M.Sc. (Home Science) (All Specialization) (Annual Pattern) have already provided sufficient additional chances as per Notifications mentioned under references 1) to 8), notified earlier by the University from time to time.

As the equivalence to the subjects/papers of old course into new course is not possible, hence as decided by the authorities of the University, it is notified for general information of all concerned that the failure students of B.Sc. (Home Science) (Annual Pattern – Old Course) and M.Sc. (Home Science) (All Specialization) (Annual Pattern – Old Course) after exhausting the last chance shall have to appear as a fresh student.

Sd/-
Registrar,
Sant Gadge Baba Amravati University,
Amravati

NOTIFICATION

No. : 62/ 2015

Date : 18/06/2015

Subject : ADDITIONAL CHANCES FOR FAILURE STUDENTS OF OLD COURSE OF B.TECH. (COS) & M.TECH. (COS).

Refⁿce: 1) Notification No.27/2014, dt.20.3.2014
 2) Notification No.90/2012, dt.5.7.2012

It is notified for general information of all concerned that the authorities of the University have provided the additional two chances for B.Tech. (Cosmetics) Part-II (Annual Pattern) (Old Course) and M.Tech. (Cosmetics) Sem-I (Semester Pattern) (Old Course) i.e. Upto Summer-2016.

Sd/-
 Registrar,
 Sant Gadge Baba Amravati University,
 Amravati

NOTIFICATION

No. : 63/ 2015

Date : 18/6/2015

Subject : Continuation of Prospectus of various Examinations in the Faculty of Medicine (including Pharmaceutical Sciences, Dentistry and Homoeopathy) for the Session 2015-16.

It is notified for general information of all concerned that the syllabi prescribed for the session 2014-2015 for the various Examinations in the Faculty of Medicine (including Pharm. Sciences, Dentistry & Homoeopathy) as mentioned in column No.2 of the following table, bearing Prospectus Nos. as mentioned in column No.3 of the said table shall continue for the session/semester/examination, as it is or with changes notified vide notification numbers / Direction Nos. as mentioned under column No.4 of the said table.

TABLE

Sr. No.	Name of Examination	Prospectus No.	Continued for Session/ Semester/ Examination (As it is / along with Notification No. / Direction No.)
1	2	3	4
1	First B.Pharm. (Sem-I & II)	2013144	Semester-I-Winter2015; Semester-II-Summer-2016 (As it is)
2	Second B.Pharm. (Sem-III & IV)	2014145	Semester-III-Winter2015; Semester-IV-Summer-2016 (As it is)
3	Third B.Pharm. (Sem-V & VI)	2015146	Semester-V-Winter2015; Semester-VI-Summer-2016 (As it is)
4	Final B.Pharm. (Sem-VII & VIII)	2014147	Semester-VII-Winter2015; Semester-VIII-Summer-2016 (As it is)
4	M.Pharm. Sem-I to IV (Industrial Pharmacy)	20121417	Semester-I & III-Winter2015; Semester-II & IV-Summer-2016 (As it is)
5	M.Pharm. Sem-I to IV (Pharmacognosy)	20121427	Semester-I & III-Winter2015; Semester-II & IV-Summer-2016 (As it is)
6	M.Pharm. Sem-I to IV (Pharmaceutics)	20121429	Semester-I & III-Winter2015; Semester-II & IV-Summer-2016 (As it is)
7	M.Pharm. Sem-I to IV (Pharmaceutical Chemistry)	20151430	Semester-I & III-Winter2015; Semester-II & IV-Summer-2016 (As it is)
8	M.Pharm. Sem-I to IV (Quality Assurance)	20121431	Semester-I & III-Winter2015; Semester-II & IV-Summer-2016 (As it is)
9	M.Pharm. Sem-I to IV (Pharmacology)	20121432	Semester-I & III-Winter2015; Semester-II & IV-Summer-2016 (As it is)
10	Pharm.D. Part-I to IV	20131433	Summer-2016 (As it is)

Sd/-
 Registrar
 Sant Gadge Baba Amravati University

NOTIFICATION

No. 64./2015

Date : 18/6/2015

Subject : **Continuation of Prospectus No.2015151 of B.Com.Part-I.**

It is notified for information of all concerned that the Prospectus No.2015151 prescribed for B.Com. Part-I Examination of Summer-2015 shall be continued for B.Com. Part-I Examination of Summer-2016 and onwards with following corrections.

Sr.No.	Particulars Reference in Prospectus No.2015151 of B.Com.Part-I Examination.	Corrections/Additions/Substitutions.
01.	Page Nos. 21 & 22	The syllabi printed on Page Nos.21&22 under the paper title 1. LANGUAGES (i) COMPULSORY ENGLISH be substituted by the syllabi as given in Appendix-A, which is appended with this Notification.
02.	Page Nos. 31 to 33	The syllabi printed on Page Nos.31to33 under the paper title BUSINESS ECONOMICS (Excluding Books Recommended) be substituted by the syllabi as given in Appendix-B, which is appended with this Notification.
03.	Page No.37	The following Reference Books be added under the list of Reference Books : *Principles of Business Management : Dr. Naglaxmi Tirmanwar- Nabh Prakashan, Amravati. *Principles of Business Management : Dr. Anilkumar Rathod, Dr. Pravin Deshmukh, Dr. Dinesh Nichit- Anuradha Prakashan, Nagpur. * व्यवसाय व्यवस्थापन (तत्त्वे आणि व्यवहार) : डॉ. दिनेश वा. निचित, डॉ. मधुकर के. गावंडे, आधार पब्लिकेशन्स अँड रिसर्च सेंटर, अमरावती.

Sd/-
Registrar
Sant Gadge Baba Amravati University

Appendix-A

B.Com.Part-I
(i) Compulsory English

Time : 3 Hours.

Marks : 70

Text prescribed for study : RAYS OF LETTERS

(As per model curriculum of the U.G.C. for B.Com.Part-I and published by Raghav Publishers and Distributors, Mahal, Nagpur.)

Unit-I	All prose pieces from the prescribed text.
Unit-II	All poems from the prescribed text.
Unit-III-	Grammar (strictly based on the prescribed text.)
	(A) Change the Narration
	(B) Change the Voice
	(C) Tense Forms
	(D) Synonyms & Antonyms
	(E) Idioms & Phrases
	(F) One Word Substitute

- Unit-IV Business Correspondence and Writing Skills (As given in the prescribed text.)
 (A) Resume Writing and E-Mails
 (B) Letter Writing : Letters of Application for Job/Complaint/Order
 (C) Preparing Newspaper Report

Distribution of Marks : (70 : 30 Ratio)

Textual Components :

Que.1 **PROSE** –

Any five questions to be attempted out of eight,
 each carrying five marks. ... 5x5 = 25 Marks

Que. 2 **POETRY**-

Any three questions to be attempted out of six,
 each carrying five marks. ... 5x3 = 15 Marks

Que.3 **GRAMMAR** (Textual)

- | | | |
|--|------|----------|
| (A) Change the Narration (Any one out of two) | 1x2= | 02 Marks |
| (B) Change the Voice (Any two out of four) | 1x2= | 02 Marks |
| (C) Tense Forms (Any three out of six) | 1x3= | 03 Marks |
| (D) Synonyms and Antonyms (Any three out of six) | 1x3= | 03 Marks |
| (E) Idioms & Phrases (Any three out of six) | 1x3= | 03 Marks |
| (F) One Word Substitute (Any two out of four) | 1x2= | 02 Marks |

Business Correspondence and Writing Skills :

- | | |
|---|-----------|
| 1) Resume Writing and E-Mails (Any one out of two) | 05 Marks |
| 2) Letter Writing :
Letters of Application for Job/Complaint/Order
(Any one out of two) | 05 Marks |
| 3) Preparing Newspaper Report.
(Any one out of two) | 05 Marks. |

Appendix-B

**B.COM. PART-I
 BUSINESS ECONOMICS**

Time : 3 Hours.

Marks : 70

Unit-I **NATURE AND SCOPE OF ECONOMICS :**

- 1.1 Definition of Economics : Adam Smith, Marshall, Robbins & J.K.Mehata.
- 1.2 Nature of Economic Laws, Types, Limitations and importance.
- 1.3 Micro & Macro Economics : Meaning, Merits & Demerits.
- 1.4 Managerial Economics : Concept and objectives.
- 1.5 Basic problems of an Economy.

Unit-II **DEMAND :**

- 2.1 Utility : Meaning, Deminishing marginal utility theory.
- 2.2 Demand : Meaning. Definition, Change in demand, Law of Demand.
- 2.3 Elasticity : Concept, Types (Price, Income & Cross).
- 2.4 Determinants, Measurement & Importance of Elasticity.
- 2.5 Working of Price Mechanism : Indifference curve, Concept & Characteristics.

Unit-III **PRODUCTION FUNCTION :**

- 3.1 Law of variable proportions.
- 3.2 ISO-quants : Concept & Characteristics.
Optimum factor combination.
- 3.3 Internal and External economics and diseconomics.
- 3.4 Short-run and long-run cost curves.
- 3.5 Total, Average and Marginal Revenue.

Unit-IV **MARKET STRUCTURES :**

- 4.1 Meaning & Classification of Markets.
- 4.2 Perfect competition : Meaning, Characteristics, Price & output determination.
- 4.3 Monopoly : Meaning, Characteristics, Types and Price determination.
Price discrimination-Meaning, types and applications.
- 4.4 Monopolistic Competition : Meaning, Characteristics & Price determination.
- 4.5 Oligopoly : Meaning, Characteristics, Indeterminate pricing, Price Leadership.

Unit-V **FACTOR PRICING :**

- 5.1 Nature of demand & supply of factors inputs, Marginal Productivity theory.
- 5.2 WAGES : Meaning, Types, Determinants of wages, Exploitation of Labour.
- 5.3 RENT : Concept, Ricardian and Modern Theories of Rent : Quasi-Rent.
- 5.4 INTEREST : Concept, Time preference, Loanable funds and Liquidity preference theory of Interest.
- 5.5 PROFIT : Concepts, Dynamic & Risk bearing theory of Profit.

Books recommended as it is.

NOTIFICATION

No. 65/2015

Date : 18/6/2015

Subject : **Continuation of Prospectus No.2015153 of B.Com.Final.**

It is notified for information of all concerned that the Prospectus No.2015153 prescribed for B.Com. Final Examination of Summer-2015 shall be continued for B.Com. Final Examination of Summer-2016 and onwards with following corrections.

Sr.No.	Reference in Prospectus No.2015153 of B.Com. Final Examination.	Corrections/ Substitutions.
01.	Page Nos. 23 & 24	The syllabi printed on Page Nos.23&24 under the paper title १) मराठी (आवश्यक) be substituted by the syllabi as given in Appendix-A , which is appended with this Notification.
02.	Page Nos. 39 to 41	The syllabi printed on Page Nos.39 to 41 under the paper title i) FUNDAMENTALS OF INSURANCE (Excluding Books Recommended) be substituted by the syllabi as given in Appendix-B , which is appended with this Notification.
03.	Page Nos. 41 & 42	The syllabi printed on Page Nos.41 & 42 under the paper title ii) INDIAN BANKING SYSTEM (Excluding Books Recommended) be substituted by the syllabi as given in Appendix-C , which is appended with this Notification.

Sd/-
Registrar
Sant Gadge Baba Amravati University

Appendix-A

वाणिज्य स्नातक अन्त्य
१. मराठी (आवश्यक)

पुस्तकाचे नांव
संपादक

प्रकाशक

: अनुबंध - भाग-३,
: डॉ. अशोक नामदेव पळवेकर,
: डॉ. पंडित राठोड, डॉ. अनंत सिरसाट
: राघव पब्लिशर्स अॅन्ड डिस्ट्रीब्युटर्स, नागपूर

अनुक्रमणिका

विभाग - अ : वैचारिक

१. श्रम
२. सभ्य स्त्री-पुरुष हो!
३. शिक्षण आणि संस्कृती
४. वैज्ञानिक दृष्टिकोनातून आंतरजातीय विवाह
५. संत तुकारामांची सार्वकालिकता

जिब्रान खलील जिब्रान
सयाजीराव गायकवाड
नरहर कुरुंदकर
नरेंद्र दाभोळकर
अशोक राणा

विभाग - ब : ललित

६. लोकजीवनातील वृक्षपूजा
७. बाबूराव शिर्के
८. पाणी अडवा-पाणी जिरवा
९. गंगमन
१०. नारी

द. ता. भोसले
प्र. चिं. शेजवलकर
बाबा भांड
सदानंद पुंडगे
तसलिमा नासरिन

विभाग - क : कविता

११. पाहा परदारा जननिये समान	संत नामदेव
१२. दोन अभंग	सोयराबाई
१३. मज लोभस हा इहलोक हवा	बा. भ. बोरकर
१४. तू वसंत पांघरून	ललित सोनोने
१५. बोलणं	वसंत आबाजी उहाके
१६. मोकाट ग्रहांचा फकीर	सुधाकर गायधनी
१७. काही फरक पडत नाही	अरुण काळे
१८. सक्रीय सावल्या आहेत इतिहासात	रवींद्र इंगळे चावरेकर

विभाग - ड : निबंध

(सामाजिक, पर्यावरणासंबंधी आणि उद्योजकता विषयक आधारित)

आवश्यक मराठीची एक प्रश्नपत्रिका राहिल.

वेळ : २ तास

गुण: ३५

विभाग - अ	वैचारिक	पाठ क्र. १ ते ५	-	१० गुण
विभाग - ब	ललित	पाठ क्र. ६ ते १०	-	१० गुण
विभाग - क	कविता	कविता क्र. ११ ते १८	-	०८ गुण
विभाग - ड	निबंध	—	-	०७ गुण
				३५ गुण

प्रश्नपत्रिकेचे स्वरूप

प्रश्न - १ ला	वैचारिक	-	एक दिर्घोत्तरी	०६ गुण
प्रश्न - २ रा	वैचारिक	-	एक लघुत्तरी	०४ गुण
प्रश्न - ३ रा	ललित	-	एक दिर्घोत्तरी	०६ गुण
प्रश्न - ४ था	ललित	-	एक लघुत्तरी	०४ गुण
प्रश्न - ५ वा	कविता	-	दोन लघुत्तरी	०८ गुण
प्रश्न - ६ वा	निबंध	-	एक निबंध	०७ गुण

(उद्योजकताविषयक, सामाजिक आणि पर्यावरणासंबंधी विषयांवर आधारित) एकूण गुण : ३५ गुण

सूचना -

- (१) प्रत्येक दिर्घोत्तरी व लघुत्तरी प्रश्नाला अंतर्गत पर्याय राहिल.
- (२) प्रश्न क्रमांक १ ते ४ यांना प्रत्येकी अंतर्गत पर्याय राहतील.
- (३) प्रश्न क्रमांक ५ मध्ये अ आणि ब असे दोन विभाग राहतील. प्रत्येक विभागात दोन लघुत्तरी प्रश्न विचारले जातील. अ किंवा ब विभागापैकी एक विभाग सोडवावा लागेल.
- (४) निबंधासाठी पाच विषय दिले जातील, त्यापैकी एका विषयावर सुमारे ३०० शब्दांचा निबंध लिहावा लागेल.

Appendix-B

B.COM. FINAL

(Combination-III-Banking And Insurance)

i) FUNDAMENTALS OF INSURANCE

TIME : 3 Hours.

Marks : 70

Unit-I INTRODUCTION :

- 1.1 Concept, Meaning and brief History of Insurance.
- 1.2 Purpose and Need of Insurance.
- 1.3 Nature, Scope and Role of Insurance as a social security tool.
- 1.4 Principles of Insurance.
- 1.5 Current trends in Insurance services in India.

Unit-II INSURANCE AGENT :

- 2.1 Meaning of an Agent and procedure for obtaining an Agency.
- 2.2 Various functions of an Agent.
- 2.3 Remuneration and compensation of an Agent.
- 2.4 Validity/Suspension/Termination of an Agency.
- 2.5 Agents Regulation and Code of Conduct.

Unit-III TYPES OF INSURANCE :

- 3.1 Life Insurance- Meaning, Importance, Classification of Policies, Surrender value, Settlement of Policy claims.
- 3.2 Marine Insurance- Meaning, Nature, Importance and settlement of claims.
- 3.3 Fire Insurance- Meaning, Nature, Importance and settlement of claims.
- 3.4 Crop Insurance- Meaning, Scope, Importance, and settlement of claims.
- 3.5 Event, Accident and property Insurance- Meaning, Scope, Importance and settlement of claims.

Unit-IV **MARKETING :**

- 4.1 Organizational set-up of Insurance Companies.
- 4.2 Product and Actuarial Profession.
- 4.3 Product Pricing and Actuarial Aspect.
- 4.4 Distribution channels.
- 4.5 Market Share and Promotion Strategy.

Unit-V **CONTROL AND REGULATION OF INSURANCE :**

- 5.1 The Insurance Regulatory and Development Authority Act,2000.
- 5.2 Amendments in IRDA Act, up to 2012.
- 5.3 General Insurance Business (Nationalization) Act,1972.
- 5.4 Life Insurance Act,1956.
- 5.5 Control and Regulation of Private Insurance Companies.

Books Recommended as it is.

Appendix-C

B.COM. FINAL
(Combination-III-Banking And Insurance)
ii) INDIAN BANKING SYSTEM

TIME : 3 Hours.

Marks : 70

Unit-I **INDIAN BANKING SYSTEM :**

- 1.1 Meaning, Brief History, Structure and organisation of Banking.
- 1.2 Types of Banking- Unit Banking, Branch Banking, Retail Banking.
- 1.3 E-Banking Services- ATM, Debit Card, Credit Card, E-Money Transfer, Core Banking, Agency Services.
- 1.4 Nature, Scope and Importance of Banking Services.
- 1.5 Current Trends in Banking Services in India.

Unit-II **CO-OPERATIVE AND DEVELOPMENT BANKS :**

- 2.1 Co-operative Banks- Meaning and Structure.
- 2.2 Functions and Importance of Co-operative Banks.
- 2.3 Regional Rural Bank- Meaning, Objectives.
- 2.4 Importance of RRBS in Rural Development.
- 2.5 Development Bank- Concept, Objectives and significance in Economic development.

Unit-III **COMMERCIAL AND PRIVATE BANKS :**

- 3.1 Commercial Bank- Meaning, Definition and structures.
- 3.2 Functions and Importance of Commercial Bank.
- 3.3 Credit Policy of Commercial Bank.
- 3.4 Private Bank- Concept, Meaning & Role of Private Bank in Indian Economy.
- 3.5 Foreign Banks- Concept, Working and Services rendering in India.

Unit-IV **STATE BANK OF INDIA AND RESERVE BANK OF INDIA :**

- 4.1 Brief History, Objectives and functions of S.B.I.
- 4.2 Organisation and Management of S.B.I.
- 4.3 Importance in Economic Development of S.B.I.
- 4.4 R.B.I - Objectives, Functions and Management of R.B.I.
- 4.5 Monetary Policy- Meaning, Credit Control & its Measures.

Unit-V **REGULATION OF BANKS :**

- 5.1 Banking Regulation Act 1949- Brief History & Social Control.
- 5.2 Regulation of Private, Foreign & Commercial Bank.
- 5.3 Main provisions and their applications of Banking Regulation Act 1949.
- 5.4 Regulation of Banks By R.B.I.
- 5.5 Provisions Regarding NPA.

Books Recommended as it is.

NOTIFICATION

No. 66/2015

Date : 18/6/2015

Subject : Continuation of Prospectus No.20111512 of B.B.A. Part-I,II & Final.

It is notified for information of all concerned that the Prospectus No.20111512 prescribed for B.B.A. Part-I,II & Final.Examinations of Summer-2015 shall be continued for B.B.A. Part-I,II & Final Examinations of Summer-2016 and onwards with following corrections.

Sr.No.	Reference in Prospectus No.20111512 of B.B.A. Part-I,II& Final.	Corrections/Additions
01.	Page Nos. 17 & 18	The following Reference Books be added under the list of Reference Books : *Dr. Naglaxmi Tirmanwar : Principles of Business Management - Nabh Prakashan, Amravati. * Dr. Anilkumar Rathod, Dr. Pravin Deshmukh, Dr. Dinesh Nichit : Principles of Business Management - Anuradha Prakashan, Nagpur. * व्यवसाय व्यवस्थापन (तत्त्वे आणि व्यवहार) : डॉ. दिनेश वा. निचित, डॉ. मधुकर के. गावंडे, आधार पब्लिकेशन्स अँड रिसर्च सेंटर, अमरावती.
02.	Page Nos. 20 & 21	Dr. Anilkumar Rathod, Dr. Sunita Dhote, Dr. Manish Vyas : Marketing Management- Anuradha Prakashan, Nagpur.

The Authorities of the University has decided that the teaching workload of 5 periods per week be allotted to the each theory subjects of B.B.A. Part-I, Part-II & Final respectively.

Sd/-

Registrar

Sant Gadge Baba Amravati University Amravati.

NOTIFICATION

No. 67/2015

Date : 18/6/2015

Subject : Continuation of Prospectus No.2014154 of M.Com. Part-I & Part-II.

It is notified for information of all concerned that the Prospectus No.2014154 which was prescribed for M.Com. Semester-I&III Examinations of Winter-2014 & Semester-II&IV Examinations of Summer-2015 shall be continued for M.Com Semester-I&III Examinations of Winter-2015 & Semester-II&IV Examinations of Summer-2016 with following corrections.

Sr.No.	Reference in Prospectus No.2014154 of M.Com.Part-I&II Examinations (Semester Pattern)	Corrections/Additions/Substitutions.
01.	Page No. 17	The following Reference Book be added under the title Reference Books : *Dr. Prakash Rajankar : Services Marketing and Customer Relationship Management, Pimpalpure Books Distributors, Nagpur.
02.	Page No.23	The following Reference Book be added under the title Books Recommended : *Dr. Prakash Rajankar : Strategic Management, Pimpalpure Books Distributors, Nagpur.
03.	Page Nos. 24 & 25	The syllabi printed on Page Nos.24 & 25 under the paper title M.Com.204-COMPUTER APPLICATIONS IN BUSINESS (Excluding Books Recommended) be substituted by the syllabi as given in Appendix-A, which is appended with this Notification.

04	Page No.27	The syllabi printed on Page No.27 under the paper title M.Com.301-RESEARCH METHODOLOGY (Excluding Books Recommended) be substituted by the syllabi as given in Appendix-B, which is appended with this Notification.
05.	Page No.28	The following Reference Book be added under the title Books Recommended : *Fundamentals of Marketing Research-Dr. M.K.Gawande, Chandralok Prakashan, Kanpur.
06.	Page Nos. 32 & 33	The syllabi printed on Page Nos.32&33 under the paper title M.com.304-E-COMMERCE AND LEGAL SECURITY (Excluding Books Recommended) be substituted by the syllabi as given in Appendix-C, which is appended with this Notification.
07.	Page Nos. 41 & 42	The syllabi printed on Page Nos.41&42 under the paper title M.com.402-B(2)-CO-OPERATIVE MANAGEMENT be substituted by the syllabi as given in Appendix-D, which is appended with this Notification.

Sd/-

Registrar

Sant Gadge Baba Amravati University Amravati.

Appendix-A

Semester - II

M.COM.204

COMPUTER APPLICATIONS IN BUSINESS

Time : 3 Hours

Theory : 60 Marks

Practical : 40 Marks

Objective: The objective of this course is to provide knowledge and understanding the application of relevant softwares in Business Data Analysis for Accounting and Decision Making.

Unit I Word Processing:

Working with MS Word 2007/ Higher: Working with MS-Word-Word Basic Commands, Formatting-text and Documents, Sorting and Tables, Working with Graphics, Mail-merge. Insert: Endnotes, Footnotes, Page Numbers, Index, Equations, Symbols, Smart Arts, Shapes, Word Arts, Signature Line, Date & Time, Hyperlink, Bookmark, Picture, Clip Arts & Charts.
Create: Table of Contents, Citation & Bibliography, Protect Document.

Unit II Computerised Accounting:

Working with Tally 9.0/ Higher-

Accounts Info: Groups, Ledgers, Budgets, Scenarios, Currencies, Voucher Types.

Payroll Info: Pay Heads, Employees Groups, Employee's Salaries Details, Units (Works), Attendance, Production Types, Voucher Types.

Inventory Info: Stock Groups, Stock Categories, Stock Items, Unit of Measures, Godown, Price List, Reorder Level, Voucher Types.

Unit III Computerised Accounting & Taxation:

Transactions: Accounting, Payroll and Inventory Vouchers.

Tally Vault & Security Control: Backup, Restoring Data and Security Control.

Statutory Info: TDS, Nature of Payments, and Dedicatee Types.

Statutory Reports: Excise, CST, TDS. Display: Trial Balance, Day Book, Account Books, Statement of Accounts, Inventory Books, Statement of Inventory, Cash/Fund Flow, List of Accounts, Exceptional Reports, Purchase Order, Sales Order, Invoice.

Unit IV Spread Sheet:

Working with MS Excel 2007/Higher-

Formatting, Chart Features, Graphics, Using Worksheets as Database in Accounting, Marketing, Finance and Personnel Areas. Creating a Dynamic Worksheet, Absolute and Relative Cell Reference.

Functions-

Mathematical: ABS, CELLING, EVEN, GCD, INT, LCM, LN, LOG, LOG10, ODD, POWER, RAND, ROUND, SQRT, SUM and SUMIF.

Financial: CUMPMT, CUMPRINC, DB, FV, INTRATE, IPMT, NPV, PMT, PPMT, PV and RATE.

Statistical: AVERAGE, CORREL, COUNT, FREQUENCY, GEOMEAN, HARMEAN, MAX, MEDIAN, MIN, MODE, PEARSON, PERCENTILE, RANK, SKEW, STDEV and STDEVP.

Logical: AND, FALSE, IF, NOT, OR and TRUE.

Unit V Analysis and Decision Making Tools :

Analysis in MS Excel 2007/ Higher : Anova, Correlation, Covariance, Descriptive Statistics, Exponential Smoothing, F-Test, Fourier Analysis, Histogram, Moving Average, Random Number Generation, Rank and Percentile, Regression, Sampling, t-Test, z-Test, What-if Analysis, Goal Seek, Pivot Table & Chart.

Introduction to SPSS 16/ Higher : Features, Uses and Applications.

Descriptive Statistics: Frequencies, Descriptive, Explore, Crosstab, Ratio.

Graphs: Bar, 3-D Bar, Line, Area, Pie, High-Low, Box Plot, Error Bar, Scatter/Dot, and Histogram.

Regression: Automatic Linear Modelling.

Books Recommended :

As Per Existing Syllabus.

Practical Based on Syllabus:

1. Ms Word 2007/ Higher.
2. Excel 2007/ Higher.
3. Tally 9.0 / Higher.

Scheme:

As Per Existing Syllabus.

Appendix-B

SEMESTER III

M.COM. 301

RESEARCH METHODOLOGY

Time : 3 Hours

Theory: Marks 80

Objective: This course aims to make students conversant with the basic principles and theoretical concepts of the Research Methodology and guide them in their applications, so the students will be able to write Project Report for the course M.Com. 401 (Semester -IV).

Unit-I Introduction to Research :

Meaning, Definitions, Objectives, Scope, Significance, Features, Limitations, Qualities of Good Research and Resources, Ethics in record.

Type of Research : Historical, Descriptive, Experimental, Formulative, Diagnostic Study, Evaluation Study, Action Research, Survey, Field Study & Case Study.

Unit II : Research Plan, Design and Process of Research :

Research Problem- Concept and Source of Research Problem, Criteria of Good Research Problem, Selection and Formulation of Research Problem.

Research Design- Meaning & Definitions of Research Design, Factors Affecting Research Design, Steps in Preparation of Research Design, Classification of Research Design, Features of a Good Research Design.

Hypothesis: Meaning, Definitions and Sources of Hypothesis, Functions and Classification of Hypothesis, Criteria of Workable Hypothesis, Formulation of Hypothesis, Difficulties in Formulation of Hypothesis, Testing of Hypothesis.

Sampling Techniques: Meaning, Definition and Significance of Sampling, Elements & Principles of Sampling Technique, Essentials of Good Sampling, Selection of Appropriate Method of Sampling, Criteria of Sample Design, Defects of Sampling Techniques, Advantages of Census, Types of Sampling- Probability & Non-probability, Sampling Errors- Biased & Unbiased Errors.

Unit III : Documentary Sources of Information and Data:

Information & Data Sources: Meaning and Importance of Information and Data, Sources and Methods of Collection of Information & Data.

Primary Data: Meaning, and Importance of Primary Data, Methods of Primary Data- Observation, Interview, Questionnaire and Schedule, Limitations of Primary Data Collection.

Secondary Data: Meaning, Importance, Sources and Methods of Secondary Data and Limitations of Secondary Data.

Unit IV: Analysis & Interpretation of Data:

Steps of Data Processing- Steps in Data Analysis & Processing, Editing, Coding, Classification, Transcription of Data, Tabulation, Construction of Tables, Graphs, Charts, & Diagram, Interpretation of Data & Information, Comparison in Interpretation, Statistical Analysis & Inference, Generalisations and Conclusion.

Application of Statistical Tools: Basic Statistical Techniques, Use of Computer base Statistical Packages in Research - Excel & SPSS.

Unit V: Research Report Writing :

Meaning, Definitions and Significance of Research Report, Types of Report- Written and Oral, Format & Contents of Research Report, Stages in Preparing Research Report, Guidelines for Research Report Writing, Criteria of Good Research Report, Evaluation of Research Report.

Assignments: It is expected that the assignments should be based on Field Survey, Case Study or Research Paper.

Books Recommended (As it is)

Appendix-C

M.COM.304

E-COMMERCE AND LEGAL SECURITY

Time : 3 Hours

Theory - 60 Marks
Practical- 40 Marks

Objective: The objective of this course is to enable students to gain knowledge about e-Commerce and its various components with legal security.

Unit I Internet & Web Designing:

Internet Concepts and Technologies: Concept and Evolution of Internet, Internet Protocols.

Web-site Design: Website Strategies and Web-site Design Principles, Website Designing through HTML, FrontPage Express and Cascading Style Sheet.

Unit II Applications of e-Commerce:

Introduction: Meaning and Concept, e-Commerce v/s Traditional Commerce, e-Commerce and e-Business, Channels of e-Commerce, Media convergence, Business Applications of e-Commerce, Needs of e-Commerce, e-Trading System. Concept of B2C, B2B, B2G, G2B, C2C in e-Commerce.

E-Commerce Infrastructure: Product and Service Digitisation, Remote Servicing, e-Procurement, On-line Marketing and Advertising e-Commerce Resources and Infrastructure, Supply Chain Management, Logistic Management.

Electronic Payment Systems: Special Features & Components of an Electronic Payment System, e-Cash, Cyber Cash, e-Cheques, Credit Cards, ATM-Cum- Debit Cards, Smart Cards and Internet Banking.

Unit III e-Commerce Mechanism:

Business to Business: Need and Alternative Models of B2B, e-Commerce Technologies, EDI and Paperless Trading, EDI - Architecture, Features and Standards. Internet based EDI.

Business to Consumer: Cataloguing, Order Planning and Order Generation, Order Selection and Prioritization, Order Scheduling, Cost Estimation and Pricing, Order Receipt and Accounting, Order Fulfilling and Delivery, Order Billing and Payment Management, Post Sales Services.

Business to Government: e-Governance, e-Tender and e-Filling.

Unit IV Information Technology Act, 2000 & Amendments:

Information Technology Act, 2000: Aims and Objectives.

Technical Aspects: Unauthorized Access & Hacking, Trojan Attack, Virus and Worm Attack, e-Mail & IRC Related Crimes: Spoofing, Spamming, Bombing of e-Mail, Denial of Service Attacks, Types of DOS Attack. Forgery, IPR Violations, Cyber Terrorism, Banking/Credit Card Related Crimes, e-Commerce/ Investment Frauds, Sale of Illegal Articles, Online Gambling, and Defamation.

Unit V Security issues in E-Commerce:

Cyber Stacking: Pedophiles, Identity Theft, Data Diddling, Theft of Internet Hours, Theft of Computer System (Hardware), Physically Damaging a Computer System, Breach of Privacy and Confidentiality.

Security Issues: Risks in E-Commerce, Exposure of Resources, Types & Sources of Threats, Security Tools and Risk-Management Approach, e-Commerce Security and Rational Security Policy for e-Commerce, Corporate Digital Library, Digital Signature, Penalties and Adjudication for Various Offences.

Books Recommended :

As Per Existing Syllabus.

Division of Marks :

As Per Existing Syllabus.

Practical Based on Syllabus:

1. Website Designing Through HTML & Front Page
2. On Line Transitions

Scheme:

As Per Existing Syllabus.

Appendix-D

M.Com. Semester-IV

M.Com.402-B-(2)- CO-OPERATIVE MANAGEMENT

Time : 3 Hours

Theory Marks :80

Unit-I Introduction to Co-operation and Management :

- 1.1 Co-operation : Meaning, Definition, Scope, Importance, Principles and need of Co-operation.
- 1.2 Management : Meaning, Nature, Scope, Principles, Objectives, Importance & Need.
- 1.3 Development of Management thoughts in Co-operative Management.
- 1.4 Traditional Management in Co-operation, Need & Principles of professional Management. Contribution of Vaikunthlal Mehta, Dhananjayrao Gadgil in Co-operative Management.
- 1.5 Computerisation : Need & Impact on Transperent and efficient Management.

Unit-II Human Resource Management :

- 2.1 Members, Power, Duties, Responsibilities & Role in Management.
- 2.2 Board of Directors : Power, Duties, Responsibilities, Role in Management & Meetings.
- 2.3 Executives : Chairman, Secretary, Manager/Managing Director; Power, Duties & Responsibilities and Role in Management.
- 2.4 Employees : Recruitment, Training, Promotion, Duties, Responsibilities and Role in Management.
- 2.5 Human Relation in Co-operation : Motivation, Need of efficiency and transperancy in Co-operative Management

Unit-III Financial Management :

- 3.1 Indicators of efficiency, Resource Mobilization, Minimization of cost of capital.
- 3.2 Capital Structure : Three Tier credit system in Co-operation- Funding Agencies- NABARD, RBI, SBI, NCDC, Govt.
- 3.3 Accounting of Co-operatives.
- 3.4 Management of Co-operative Credit, Funds and reserve in efficient Manner.
- 3.5 Efficient Mechanism for recovery.

- Unit-IV Marketing Management :**
- 4.1 Meaning, Nature, Scope, Need of Marketing in Co-operation.
 - 4.2 Brand Ambassador, Sales & Advertisement, Sales promotion in Co-operatives.
 - 4.3 Issues and challenges of marketing in Co-operatives.
 - 4.4 Environment : Components and its impact on marketing, Factors
Contributing to development of marketing.
 - 4.5 Co-operative marketing strategies, Role of NAFED, Maharashtra State Marketing Federation.

- Unit-V Co-operative Legislation :**
- 5.1 Brief History, Features and importance of Co-operative Legislation in India, Co-operative Societies Act. 1912.
 - 5.2 Model Co-operative Societies Act. 1991 : Objectives, Silent features and provisions with Amendment.
Multi State Co-operative Societies Act. 2002 - Objectives, Silent Features and provisions with Amendment.
 - 5.3 Maharashtra State Co-operative Act. 1960 : Provisions and amendments upto 2012.
 - 5.4 Regulation of Co-operative Credit and Co-operative Banks by RBI.
 - 5.5 Audit : Audit memo and its rectification, Settlement of disputes and Appeal, Revision and reviews.

REFERENCE BOOKS :

1. Mamori C.B, Saksena R.D : Co-operation in India, Kitab Mahal, Allahabad.
2. Mathur B.S : Co-operation in India, Sahitya Bhawan, Agra-1971.
3. Dr. Nakkiran S : Co-operative Management & Techniques, Himalaya Publishing House, Mumbai.
4. Gosavi B : Performance of Co-operative, Chandralok Prakashan, Kanpur-2005.
5. Kamat G.S : New Dimensions of Co-operative Management, Himalaya Publication, Mumbai-2011.
6. Shrivastava R.M. : Fundamentals of Co-operative Financing, Wisdom Publication, Allahabad-1979.
7. Singh L.P : Co-operative Marketing in India and Aboard, Himalaya Publication, Mumbai-2000.
8. Karthekayan M, Nakkiran : Entrepreneurship in Co-operative, Discovery Publication, New Delhi-2012.
9. Karthekayan M, Nakkiran : Co-operation and Administration, Discovery Printing, New Delhi-2012.
10. Sharada V : The Theory of Co-operation, Himalaya Publication-2004.
11. Subha Rao : Human Resource Management, Himalaya Publication House, Mumbai.
12. Jain L.C : Co-operative Law in India
13. प्रा.ए.आर. रायखलकर, प्रा.अशोक डांगे : सहकार तत्त्वे आणि व्यवहार.
14. डॉ. गो.स. कामत : सहकार तत्त्वे आणि व्यवस्थापन.
15. विद्या घाणेकर : सहकारी कायदा.
16. मा. वि. नातु, प्र.द. येरवडेकर : सहकारी संस्थांचे व्यवस्थापन.
17. मधूकर गावंडे : सहकार तत्त्वे आणि व्यवहार, हिमालय पब्लिशिंग हाऊस प्रा.लि. गिरगांव-मुंबई-४७.
18. Dr. N.Arundhati, Dr. Shriprabhu Chapke : Perspectives of Co-operative Management, Publisher- Saijyoti Publication, Nagpur.

NOTIFICATION

No. 68 /2015

Date :18.06.2015

Subject: Change of Name of University Students

The applications for change of names of the following students mentioned in column No. 2 have been found in order as provided in para 2(i) of the Ordinance No. 109 vide provisions given in column no. 3 in respect of recording the change of names in the University records.

It is notified that, in accordance with the provisions of para 4 of the said Ordinance hereby grant the change of names of the students as stated in column No. 4 below:

Sr. No.	Old Name	Provision of Ordinance No. 109	Changed Name
1	2	3	4
1.	Ku.Seema Mangilalji Rathi	2(i)(a)	Sau.Seema Rajesh Zanwar
2.	Ku.Shital Uddhav Hiwale	2(i)(a)	Sau.Shital Sudhir Patil
3.	Ku.Yogita Tukaram Mahalle	2(i)(a)	Sau.Yogita Sanjay Jumale
4.	Ku.Sangita Shriram Yengal	2(i)(a)	Sau.Sangita Vinod Chitvar
5.	Ku.Anjali Dnyandeo Badode	2(i)(a)	Sau.Anjali Bhagwan Pardhi
6.	Ku.Anamika Kushal Sharma	2(i)(a)	Sau.Anamika Pankaj Sehgal.
7.	Naba Rubab Ukhale	2(i)(f)	Naba Rubab Ukarde
8	Ku.Pooja Rajkumar Rathi	2(i)(a)	Ku.Chetana Rajkumar Rathi.

Sd/-

(Dr. J.D.Wadate)

Controller of Exams.

Sant Gadge Baba Amravati University Amravati.
