SOPHIA COLLEGE FOR WOMEN (EMPOWERED AUTONOMOUS)

Affiliated to

UNIVERSITY OF MUMBAI

Syllabi for the Common Courses

Based on the National Education Policy 2020

Open Electives A & B

Course Code: OE-A and OE-B

F.Y.B.A. & F.Y.B.Sc.

2024-25 (NEP)

Programme Outline : Open Elective – A
FYBA & FYBSc (SEMESTER I)

Course Code	Name of the Course	Credits
OE101A	Butterfly Gardening	2
OE102A	Electricity from Biosystem	2
OE103A	Graphical representation of Numerical Information	2
OE104A	Communication Studies: Basic Concepts and Theory	2
OE105A	Getting Rights Right in India	2
OE106A	Concepts of Evolution	2
OE107A	Food Packaging Technology	

Programme Outline : Open Elective – B
FYBA & FYBSc (SEMESTER I)

Course Code	Name of the Course	Credits
OE101B	Nutrition & Public Health	2
OE102B	Laser & its Application	2
OE103B	Number System and their Applications	2
OE104B	The History of Film: From the Lumière Brothers to D. W. Griffith	2
OE105B	Natya Evam Rangmanch Kala	2
OE106B	Serendipity: Discoveries Triggered by Chance	2
OE107B	Microbes and Human Health	

Programme Outline : Open Elective – A
FYBA & FYBSc (SEMESTER II)

Course Code	Name of the Course	Credits
OE201A	Nutrition & Public Health	2
OE202A	Electricity from Biosystem	2
OE203A	Graphical representation of Numerical Information	2
OE204A	Communication Studies: Basic Concepts and Theory	2
OE205A	Getting Rights Right in India	2
OE206A	Science of Genetics	2
OE207A	Food Packaging Technology	2
OE208A	Food, Nutrition and Health	2

Programme Outline: Open Elective – B
FYBA & FYBSc (SEMESTER II)

Course Code	Name of the Course	Credits
OE201B	Butterfly Gardening	2
OE202B	Number System and their Applications	2
OE203B	The History of Film: From the Lumière Brothers to D. W. Griffith	2
OE204B	Natya Evam Rangmanch Kala	2
OE205B	Serendipity: Discoveries Triggered by Chance	2
OE206B	Microbes and Human health	2

ASSESSMENT DETAILS:

Continuous Assessment (50 marks)

1. A minimum of two activities will be given in each semester.
2. Each will be for 20 marks.
3. The nature of the activities will be decided by the Examiner and may include Assignment/ MCQs/ Short notes and/or any other type of /combination of objective or descriptive type activity.
4. 10 marks will be given for Class participation.

Open Elective – A

NAME OF THE COURSE	**BUTTERFLY GARDENING**
CLASS	FYBA & FYBSc
COURSE CODE	**OE101A and OE201B**
NUMBER OF CREDITS	2
NUMBER OF LECTURES PER WEEK	2
TOTAL NUMBER OF LECTURES PER SEMESTER	30
EVALUATION METHOD	CONTINUOUS ASSESSMENT
TOTAL MARKS	50
PASSING MARKS	20

COURSE OBJECTIVES:

CO 1.	Understand the role of butterflies in ecosystems
CO 2.	Understand the ecological significance of butterfly garden
CO 3.	Impart the skills for setting and maintaining a butterfly garden

COURSE LEARNING OUTCOMES:

CLO 1.	The learner will be able to identify butterflies with special reference to Mumbai
CLO 2.	The learner will be able to create and maintain a butterfly garden as an extension activity

UNIT 1	Basic biology of butterflies (1 Credit**)**
1.1	What is a butterfly garden?
1.2	Importance of butterfly gardens, Role of butterflies in city ecosystem
1.3	Overview of butterfly classification and anatomy
1.4	Study of butterfly life cycle
1.5	Study of diversity of butterfly species in India with special reference to Mumbai (Simple key to identify common species)

UNIT 2	Art of creating a butterfly garden (1 Credit)
2.1	Selection of site for garden
2.2	Selection of plants for attracting butterflies with special reference to Mumbai -Nectar plants, Larval host plants
2.3	Designing and maintaining a butterfly garden
2.4	Care of butterfly eggs, larva and pupa
2.5	Basics of butterfly behaviour - How to enjoy your butterfly garden

REFERENCES:

1. Butterflies of Mumbai - Nelson Rodrigues, MMR Environment Improvement Society, 2012
2. The book of Indian butterflies - Isaac David Kehimkar, Bombay Natural History Society, 2008
3. The Art of Butterfly Gardening: How to Make Your Backyard, Mathew Tekulsky, SkyHorse Publishing, 2015

NAME OF THE COURSE	**ELECTRICITY FROM BIOSYSTEM**
CLASS	FYBA & FYBSc
COURSE CODE	**OE102A and OE202A**
NUMBER OF CREDITS	2
NUMBER OF LECTURES PER	2
TOTAL NUMBER OF LECTURES	30
EVALUATION METHOD	CONTINUOUS ASSESSMENT
TOTAL MARKS	50
PASSING MARKS	20

COURSE OBJECTIVES:

CO 1.	Students understand the electrical phenomenon in nature.
CO 2.	Students understand the concepts of sensors and energy harvesting technology.

COURSE LEARNING OUTCOMES:

CLO 1.	1. Sensitize regarding green technology for generation of elasticity.

UNIT 1	Bio - electricity in animals (15 LECTURES)
1.1	Introduction
1.2	Biological phenomenon in animals
UNIT 2	Bio - electricity in plants (15 LECTURES)
2.1	Biological phenomenon in plants

REFERENCES:

1. Bio electricity by Prof. Mainak Das, IIT Kanpur

https://www.digimat.in/nptel/courses/video/102104043/L01.html

2. Introductory Biochemistry by Carol Higginbotham
https://openoregon.pressbooks.pub/biochemistry/chapter/5-1-basics-of-energy-biology-libretexts/

3. Principles of Biosystem Engineering by Evangelyn C. Alocilja

https://www.egr.msu.edu/~alocilja/Teaching/Principles%20of%20BE%20Book%208-12-2013.pdf

NAME OF THE COURSE	**GRAPHICAL REPRESENTATION OF NUMERICAL INFORMATION**
CLASS	FYBA & FYBSc
COURSE CODE	**OE103A and OE203A**
NUMBER OF CREDITS	2
NUMBER OF LECTURES PER WEEK	2
TOTAL NUMBER OF LECTURES PER SEMESTER	30
EVALUATION METHOD	CONTINUOUS ASSESSMENT
TOTAL MARKS	50
PASSING MARKS	20

COURSE OBJECTIVES:

CO 1.	To understand and create appropriate graphs and diagrams of the given data.
CO 2.	To interpret and analyse graphs and diagrams of the given data.
CO 3.	To understand and create graphs for the given function.
CO 4.	To learn the applications of graphs in various formats.

COURSE LEARNING OUTCOMES:

CLO 1.	The learner will be able to create graphs and diagrams for the data given
CLO 2.	The learner will be able to interpret the graphs and the diagrams given.
CLO 3.	The learner will be able to understand the functions, its various characteristics and draw its graph.
CLO 4.	The learner will be able to identify the function from the graph shown

UNIT 1	Graphs and Diagrams
1.1	Representation of qualitative data using bar diagrams (Simple, Multiple, Segmented, Percentage), Pie diagram.
1.2	Graphical representation of raw data by stem and leaf, line graph and cross plot.
1.3	Graphical representation of frequency distribution by Histogram, frequency polygon, Cumulative frequency curve, Box and WhiskersGraphs for bivariate frequencies
UNIT 2	Functions

2.1	Ordered pairs : Cartesian product of sets in R.
2.2	Definition of Functions and their terms - Function as a special kind of relation from one set to another.
2.3	Mathematical functions, domain and range and properties of these functions − Constant; Identity; Polynomial; Modulus; Exponential; Logarithmic; Step functions; Trigonometric functions.

REFERENCES:

1. Agarwal B.L.: Basic Statistics, New Age International Ltd.
2. Spiegel M.R. : Tehory and Problems of Statistics, Schaum's Publications series, Tata Mc-Graw Hill
3. Kothari C.R. : Research Methodology: Wiley Eastern Limited.
4. Goon A.M. , Gupta M.K., Dasgupta B. : Fundamentals of Statistics, Volume II: The World Press Private Limited, Calcutta
5. R.G. Bartle- D.R. Sherbert, Introduction to Real Analysis, John Wiley & Sons, 1994.
6. Richard Courant-Fritz John, An Introduction to Calculus and Analysis, Volume I, Springer.
7. Ghorpade, Sudhir R.- Limaye, Balmohan V., A Course in Calculus and Real Analysis, Springer International Ltd, 2000.
8. G.B. Thomas and R. L. Finney, Calculus and Analytic Geometry, Ninth Edition, Addison Wesley, 1998.

NAME OF THE COURSE	**Communication Studies: Basic Concepts and Theory**
CLASS	FYBA & FYBSc
COURSE CODE	**OE104A & OE204A**
NUMBER OF CREDITS	2
NUMBER OF LECTURES PER WEEK	2
TOTAL NUMBER OF LECTURES PER SEMESTER	30
EVALUATION METHOD	CONTINUOUS ASSESSMENT
TOTAL MARKS	50
PASSING MARKS	20

COURSE OBJECTIVES:

CO 1.	The course aims to introduce students to basic concepts in communication studies.
CO 2.	The course aims to introduce students to the various models of communication as well as theoretical perspectives on mass media.

COURSE LEARNING OUTCOMES:

CLO 1.	The learner will be able to understand basic concepts in communication studies.
CLO 2.	The learner will be able to understand the various models of communication as well as theoretical perspectives on mass media.

UNIT 1	Communication: Basic Concepts
1.1	Defining communication
1.2	Mass audience and mass communication
UNIT 2	Models of Communication and Theories of Mass Media
2.1	Models of communication: Shannon and Weaver, Wilbur Schramm, James Carey
2.2	Perspectives on mass media: post-positivist, hermeneutic, critical, normative

REFERENCES:

1. Ahuja, B.K. *Mass Media Communication: Theory and Practices*. Saurabh Publishing House: New Delhi, 2010.

2. Anderson, James, and Timothy Meyer. *Mediated Communication : A Social Action Perspective (Current Communication).* SAGE Publications, 1988. CiteULike. Web. 11 Oct. 2014.

3. Beilock, Sian Ph.D."The Fear of Public Speaking." N.p., n.d. (2012). Web. 10 Dec. 2014.

4. Bormann, Ernest, and Nancy Bormann. *Speech Communication: An Interpersonal Approach*. New York: Harper & Row, 1972.

5. Harmon, Molly. "Broadcasting Blackness: A Content Analysis of Movies Aired by Black Entertainment Television (BET) Before and After Viacom's Ownership." (2012): 1-25. Web. 4 Dec. 2014. <https://www.saintmarys.edu/files/Harmon%20Pap_0.pdf>.

6. Hughes, Michael A., and George F. Hayhoe. *A Research Primer for Technical Communication: Methods, Exemplars, and Analyses*. 2nd edition. New York: Routledge, 2007. Print.

7. Hunt, S., Lippert, L., & Paynton, S. (1998). "Alternatives to traditional instruction: Using games and simulations to increase student learning*." Communication Research Reports*, 15(1), 36-44.

8. Hylmö, Annika, and Patrice Buzzanell. "Telecommuting as Viewed through Cultural Lenses: An Empirical Investigation of the Discourses of Utopia, Identity, and Mystery." Communication Monographs 69.4 (2002): 329–356. Taylor and Francis+NEJM. Web. 12 Oct. 2014.

9. Kamhawi, Rasha, and David Weaver. "Mass Communication Research Trends from 1980 to 1990." *Journalism and Mass Communication Quarterly,* 80.1 (2003): 7-27. Web. 12 Oct. 2014.

10. Neuman, W. Russell et al. "The Seven Deadly Sins of Communication Research." *Journal of Communication* 58.2 (2008): 220–237. EBSCOhost. Web. 5 Oct. 2014

NAME OF THE COURSE	GETTING RIGHTS RIGHT IN INDIA
CLASS	FYBA & FYBSc
COURSE CODE	**OE105A and OE205A**
NUMBER OF CREDITS	2
NUMBER OF LECTURES PER WEEK	2
TOTAL NUMBER OF LECTURES PER SEMESTER	30
EVALUATION METHOD	CONTINUOUS ASSESSMENT
TOTAL MARKS	50
PASSING MARKS	20

COURSE OBJECTIVES:

CO 1.	To acquaint students with the concept and evolution of human rights
CO 2.	To sensitize them to the problems and rights of the vulnerable groups

COURSE LEARNING OUTCOMES:

CLO 1.	The learner will be able to Complete and comprehensive understanding of meaning and significance of rights
CLO 2.	The learner will be able to appreciate and evaluate the rights of vulnerable groups in India

UNIT 1	Human Rights in India
1.1	Concept of human rights
1.2	Evolution of human rights in India
UNIT 2	Rights of Vulnerable groups
2.1	Rights of the prisoners and inmates in custody
2.2	Rights of Refugees
2.3	Rights of homeless people

2.4	Rights of transgendered people

REFERENCES:

1. Human Rights in India - Satvinder Juss (2019)
2. Human Rights under Indian Constitution - Swapan Deb Barma (2010)
3. *Rights of Prisoners* - National Human Rights Commission, India (2021)
4. Documentary: Tihar Jail

NAME OF THE COURSE	**CONCEPTS OF EVOLUTION**
CLASS	FYBA & FYBSc
COURSE CODE	**OE106A**
NUMBER OF CREDITS	2
NUMBER OF LECTURES PER WEEK	2
TOTAL NUMBER OF LECTURES PER SEMESTER	30
EVALUATION METHOD	CONTINUOUS ASSESSMENT
TOTAL MARKS	50
PASSING MARKS	20

COURSE OBJECTIVES:

CO 1.	To make the students understand the history of evolution.
CO 2.	To familiarize the students about the theories of evolution.
CO 3.	To introduce students with evidences of origin of life and evolution.

COURSE LEARNING OUTCOMES:

CLO 1.	Achieve an understanding of conceptual arguments for evolution.
CLO 2.	Understand the process of evolution
CLO 3.	Delineate the evidences regarding the major events in the evolutionary timescale

UNIT 1	**Theories of Evolution**
1.1	Theories of Origin of Life a. Spontaneous generation Vs. Biogenesis, other theories (special creation/steady state /Cosmozoan theory) b. Biochemical evolution (Alexander Oparin and Stanley Miller)
1.2	Lamarckian Evolution
1.3	Darwinism- concepts of variation, adaptation, struggle, fitness and natural selection, spontaneity of mutations (Example: Peppered moth evolution)
1.4	Conceptual arguments for evolution by Natural Selection given by Charles Darwin and Alfred Wallace
UNIT 2	**Evidences of Evolution**

2.1	Evidences of evolution- homologous, anatomical, geographical, biochemical, fossil- formation, types of fossils, fossil records and living fossils
2.2	Evolutionary history: The evolutionary time scale; eras, periods and epochs; major events in the evolutionary timescale

REFERENCES:

1. Lamarck’s Revenge: How Epigenetics Is Revolutionizing Our Understanding of Evolution's Past and Present, Ward P. (2018), Bloomsburg Publishing.
2. Strickberger’s Evolution, B. Hall and B. Hallgrimsson. 4th Edition (2008). Jones andBartlett.
3. Remarkable Creatures: Epic Adventures in Search of the Origin of Species, Sean B. Carrol,(2009), MarinerBooks.

SEMESTER 2

NAME OF THE COURSE	**SCIENCE OF GENETICS**
CLASS	FYBA & FYBSc
COURSE CODE	**OE206A**
NUMBER OF CREDITS	2
NUMBER OF LECTURES PER WEEK	2
TOTAL NUMBER OF LECTURES PER SEMESTER	30
EVALUATION METHOD	CONTINUOUS ASSESSMENT
TOTAL MARKS	50
PASSING MARKS	20

COURSE OBJECTIVES

CO 1.	To make the students understand the history and basics of modern genetics.
CO 2.	To make the students aware of chromosomal anomalies.
CO 3.	To make the students realise the applications of genetics.

COURSE LEARNING OUTCOMES:

CLO 1.	Achieve an understanding of classical genetics in societal setup
CLO 2.	Understand the process of gene interactions.
CLO 3.	Identify genetic disorders.

UNIT 1	**Foundations of Genetics and Societal Impacts**
1.1	1.1 Introduction to Genetics - Overview of genetics and its relevance to society - Key milestones in the history of genetics and their societal implications
1.2	1.2 Human Ancestry and Migration Patterns - Genetic insights into human evolution and migration.
1.3	1.3 The Human Genome Project - Overview of the project, findings, and societal impacts.
1.4	1.4 Public Perception of Genetic Technologies - How society views genetic modification and counseling.
UNIT 2	**Applications of Genetics**

2.1	Genetic Modification: Techniques and Applications - gene-editing technologies, such as CRISPR
2.2	Designer Babies: Ethics and Controversies - The concept of designer babies and ethical considerations.
2.3	The Role of Genetic Counseling in Medicine - Functions and importance of genetic counseling in healthcare. Case Study: Common Genetic Disorders - Analysis of case studies (e.g., cystic fibrosis, sickle cell anemia).

REFERENCES:

1. Principles of Genetics by Snustad and Simmons 4thedn. John Wiley andsons,2006.
2. iGenetics; A Molecular approach by Peter Russel 2ndedn.Pearson,2006.
3. Introduction to Genetic Analysis by Griffiths et al 8thedn Freeman andco.,2005.
4. Genes IX by Benjamin Lewin; Jones and Bartlettpublishers,2008.
5. Principles of Gene Manipulation and Genomics by S. B. Primrose and R. M. Twyman 7thed., Blackwellpublication,2007.
6. Concepts of Genetics by W. S. Klug and M. R. Cummings 7thed.Pearson,2003.
7. Concepts of Genetics by W. S. Klug, M. R. Cummings, C. A. Spencer 8thed.Pearson,2006.
8. Human Molecular Genetics by Tom Strachan and Andrew Read, 3rded. Garland Sciencepub.,2004.
9. Principles of Genetics by R. Tamarin, 7thed, BrownCo.,2002

NAME OF THE COURSE	**FOOD PACKAGING TECHNOLOGY**
CLASS	FYBA & FYBSc
COURSE CODE	**OE107A and OE207A**
NUMBER OF CREDITS	2
NUMBER OF LECTURES PER WEEK	2
TOTAL NUMBER OF LECTURES PER SEMESTER	30
EVALUATION METHOD	CONTINUOUS ASSESSMENT
TOTAL MARKS	50
PASSING MARKS	20

COURSE OBJECTIVES

CO 1.	To give a comprehensive account of various types of food packaging materials
CO 2.	To discuss forms of food packages and the tests done to check properties.
CO 3.	To highlight the importance of food /nutritional labeling.
CO 4.	To enlighten the students with novel technologies used for food packages.

COURSE LEARNING OUTCOMES:

CLO 1.	The learner will be able to compare the properties of food packaging materials and select suitable packaging material according to the characteristics of the food item.
CLO 2.	The learner will be able to explain the purpose and machines used for a variety of tests done for evaluating properties of food packaging materials.
CLO 3.	The learner will be able to comprehend details mentioned on labels of food packages.
CLO 4.	The learner will be able to diversify into the field of innovative food packaging technology.

UNIT 1	Overview of food packaging
1.1	Introduction a. Basic functions of food package b. Consumer Requirements of Food Packages

1.2	Types of food packages a. Classification of food packages based on contact with food: Primary, Secondary, Tertiary b. Forms of Packages: Rigid, semi-rigid, flexible Preformed, Form-fill-Seal Shrink and Stretch wrapping
1.3	Types of packaging materials, their characteristics and uses a. Natural materials b. Metals c. Glass d. Paper e. Plastics f. Laminates
1.4	Package testing parameters
UNIT 2	Innovations in Packaging technology and Regulations
2.1	Special feature packages / materials a. Boil-in Bag (Retort pouch) b. Aseptic packaging (Tetra pak) c. Dual Ovenable Packages d. Space food packages e. Modified atmosphere packaging (Vacuum, Gas packaging) f. Active and Intelligent packaging g. Edible films h. Green Plastics for Food Packaging
2.2	Food package labeling a. Purpose and significance b. Types of labels, Symbols c. Nutritional labelling
2.3	Introduction to a. Indian Standards and Regulations related to food packaging and labeling b. Environmental issues related to food packages and recycling of packages

REFERENCES:

1. Potter N. Hotchkiss J.H. 2007. Food Science. Indian edn: Springerlink publication.
2. Altaf U., Kanojia V., Rouf. A. 2018, Novel packaging technology for food industry, Journal of Pharmacognosy and Phytochemistry; 7(1): 1618-1625.
3. Food Safety and Standards (Packaging and Labeling) Regulations, 2011 [FSSAI - Packaging and Labeling Regulations]

NAME OF THE COURSE	**FOOD, NUTRITION AND HEALTH**
CLASS	FYBA & FYBSc
COURSE CODE	**OE208A**
NUMBER OF CREDITS	2
NUMBER OF LECTURES PER WEEK	2
TOTAL NUMBER OF LECTURES PER SEMESTER	30
EVALUATION METHOD	CONTINUOUS ASSESSMENT
TOTAL MARKS	50
PASSING MARKS	20

COURSE OBJECTIVES:

CO 1	Understand the terms, various aspects of food, nutrition and health
CO 2	Learn the basic components of food and role of water, nutrients in health
CO 3	Awareness of the adulterants/ additives & Laws and regulations related to food
CO 4	Understand the social and psychological aspects with respect to food, nutrition and health

COURSE LEARNING OUTCOMES:

The learner will be able to

CLO 1	Define the terms related to food, nutrition and health
CLO 2	Identify the basic components of food and describe role of water, nutrients in health
CLO 3	Underline the importance of food Laws and regulations
CLO 4	Correlate psychological aspects of food with respect to religious/social beliefs

UNIT 1	**Fundamentals of food, nutrition and health(15 lectures)**
1.1	**1.1. Basic terms related to the study of food, nutrition and health**

1.2	**1.2 Nutrients:** 1.2.1 Definition, essential nutrients, types of nutrients-Major & micronutrients. 1.2.2. Deficiency of nutrients & toxicity. 1.2.3. Manifestations- underweight & overweight/obesity. 1.2.4 Energy value of foods. 1.2.5 Food groups and balanced diet
1.3	**Water** -important constituents of food.Interaction of water with food affecting stability and shelf life
1.4	Therapeutic Nutrition, food supplements and nutraceuticals.
1.5	Diet for Malnutrition, diabetes and high blood pressure.
1.6	**Spices and health benefits:** Classification of spices according to their edible part .Most important spices commonly used, spice oil and oleoresin
UNIT 2	**Food laws and regulations (15 lectures)**
2.1	Food additive and uses
2.2	Food adulteration, contamination and detection using simple methods
2.3	Basic food laws and regulations: FSSAI, FDA. Food labeling.
2.4	Food safety issues and hazards
2.5	Psychosocial Aspects of Food 2.5 1 Psychology of food consumption. 2.5.2 Social compulsion of food consumption. 2.5.3 Food certification based on religious belief. Relationship between food, nutrition and health

REFERENCES:

1. A first course in food analysis- A.Y.Sathe, New Age International Ltd,2022
2. The Food Safety and standards Act, 2006 , Editorial Board of Universal Law Publishing ,2019
3. https://www.fssai.gov.in
4. https://indianlegalsolution.com/law on food adulteration
5. https://vikaspedia.in

Open Elective – B

NAME OF THE COURSE	**NUTRITION & PUBLIC HEALTH**
CLASS	FYBA & FYBSc
COURSE CODE	**OE101B and OE201A**
NUMBER OF CREDITS	2
NUMBER OF LECTURES PER WEEK	2
TOTAL NUMBER OF LECTURES PER SEMESTER	30
EVALUATION METHOD	CONTINUOUS ASSESSMENT
TOTAL MARKS	50
PASSING MARKS	20

COURSE OBJECTIVES:

CO 1.	Understand the importance of balanced diet and essential nutrients of food at different stages of life.
CO 2.	Gain knowledge about role of World Health Organization (WHO)
CO 3.	Become aware of the various national community health programs

COURSE LEARNING OUTCOMES:

CLO 1.	The learner will be able to relate the concept of balanced diet with healthy dietary habits and importance of a healthy life style
CLO 2.	The learner will be able to apply the understanding of the role of WHO in the Indian context
CLO 3.	The learner will be able to enlist the various benefits of the national health programs towards betterment of public health

UNIT 1	Concept of Balanced Diet (1 Credit)
1.1	Concept of balanced diet, The Food Guide Pyramid & MyPlate in the Indian context
1.2	Dietary recommendations for an infant, child, normal adult, pregnant women and aged
1.3	BMI calculation and its significance related to obesity

UNIT 2	Community Health Programs (1 Credit)
2.1	Definition of health, Physical, Psychological and Social health
2.2	Community health programs in India - Need for health education and health goals, Public Health Care in rural India
2.3	World Health Organization and its collaboration with India in improving public health

REFERENCES:

1.Common Diseases, Health and Hygiene - University Text Book of Zoology, F.Y.B.Sc. Semester II Course 4. Mumbai University Press.

2. Essentials of Public Health and Sanitation- Part I and Part II. All India Institute of Local Self Government.

3. Epidemiology and Management for Health Care for all. P.V. Sathe, A. P. Sathe, Popular Prakashan, Mumbai.

4. A Treatise on Hygiene and Public Health. -B. N. Ghosh. Calcutta Scientific Publishing Company.

5. Clinical Dietetics and Nutrition - F. P. Antia and Philip, Oxford University Press.

6. Dietetics - B. Srilakshmi, New Age International (P) Ltd. Publishers.

7. Food Nutrition and Health- Dr. Shashi Goyal, Pooja Gupta, S. Chand Publications.

8. Public Health Nutrition. Edited - Michael J. Gidney, Barrie M. Margetts, John M. Kearney and Lenore Arab. Willey Blackwell Publication.

9. Food and Nutrition – Vol. I and II - Dr. Swaminathan , Bappco Publication.

10. Textbook of Human Nutrition - Mahtab Bamji, Prahlad Rao.

11. Total Health by Paramjit Rana

12. Nutrition: Principles and Application in Health Promotion - J. B. Lippincott Company. Philadelphia.

13. World Health Organization: https://www.who.int/

NAME OF THE COURSE	**LASER & ITS APPLICATIONS**
CLASS	F Y BSc & FYBA
COURSE CODE	**OE102B**
NUMBER OF CREDITS	2
NUMBER OF LECTURES PER WEEK	2
TOTAL NUMBER OF LECTURES PER SEMESTER	30
EVALUATION METHOD TOTAL MARKS PASSING MARKS	SEMESTER END EXAMINATION 50 20

COURSE OBJECTIVES:

CO 1.	Acquire knowledge of the theory of Laser Physics
CO 2.	Students understand the different types of lasers and its application.

COURSE LEARNING OUTCOMES:

CLO 1.	Demonstrate and explain fundamental concepts in laser physics
CLO 2.	Demonstrate the properties and application of Laser.
UNIT 1	Introduction &Principle of Laser (15 LECTURES)
1.1	Introduction to Laser
1.2	Types of Lasers - principle, construction, working
UNIT 2	Application of Laser (15 LECTURES)
2.1	Holography & sensors

REFERENCES:

1. Laser Principles, Types and Application by KR Nambiar, New Age International.
2. Modern Spectroscopy by J Michael Hollas, Fourth Edition, John Wiley and Sons.
3. Lasers Theory and Applications by K. Thyagarajan and A.K. Ghatak, Mcmillan (1981)
4. Laser Fundamentals, by William T. Silfvast, Cambridge University Press, 2008.
5. Principles of Lasers, by Orazio Svelto; Springer, 2009.
6. Laser Spectroscopy and Instrumentation by W. Demtroder.
7. Industrial Applications of Lasers, by K. Koebner (ed.), Wiley (1984).

NAME OF THE COURSE	**NUMBER SYSTEMS AND THEIR APPLICATIONS**
CLASS	FYBA & FYBSc
COURSE CODE	**OE103B and OE202B**
NUMBER OF CREDITS	2
NUMBER OF LECTURES PER WEEK	2
TOTAL NUMBER OF LECTURES PER SEMESTER	30
EVALUATION METHOD	CONTINUOUS ASSESSMENT
TOTAL MARKS	50
PASSING MARKS	20

COURSE OBJECTIVES:

CO 1.	To recognise and apply the different principles of counting.
CO 2.	To apply the principles of permutation and combination to real life situations.
CO 3.	To identify the different methods of progression and apply them to solve various problems.

COURSE LEARNING OUTCOMES:

CLO 1.	The learner will be able to understand and apply the various principles of counting.
CLO 2.	The learner will be able to interpret the tabular data and create tabular information.
CLO 3.	The learner will be able to apply the concepts of permutations and combinations in various simulated real life situations.
CLO 4.	The learner will be able to identify and interpret the methods of progression.

UNIT 1	Basic Principles of Counting
1.1	Principles of Counting, principle of inclusion exclusion
1.2	Permutation and Combination
1.3	Binomial theorem and its applications; Pascals triangle
UNIT 2	Sequences and Series

2.1	Types of sequences and Series
2.2	Arithmetic, Geometric and Harmonic Progression
2.3	Recurring relations

REFERENCES:

1. Elementary Number Theory, David M. Burton, Second Edition, UBS, New Delhi.
2. Discrete Mathematics, Norman L. Biggs, Revised Ed, Clarendon Press, Oxford 1989.
3. A Foundation Course in Mathematics- Ajit Kumar, S. Kumaresan, Bhaba Sarma, Narosa
4. K.D. Joshi, Foundations in Discrete Mathematics, New Age Publishers, New Delhi, 1989.
5. Kenneth H. Rosen, Discrete Mathematics and its applications, Mc-Graw Hill International Edition.
6. Norman Biggs: Discrete Mathematics, Oxford.

NAME OF THE COURSE	**THE HISTORY OF FILM: FROM THE LUMIÈRE BROTHERS TO D. W. GRIFFITH**
CLASS	FYBA & FYBSc
COURSE CODE	**OE104B**
NUMBER OF CREDITS	2
NUMBER OF LECTURES PER WEEK	2
TOTAL NUMBER OF LECTURES PER SEMESTER	30
EVALUATION METHOD	CONTINUOUS ASSESSMENT
TOTAL MARKS	50
PASSING MARKS	20

COURSE OBJECTIVES:

CO 1.	The course aims to introduce students to the contribution of the Lumière Brothers and Georges Méliès to the history of film.
CO 2.	The course aims to introduce students to the contribution of Edwin S. Porter and D. W. Griffith to the history of film.

COURSE LEARNING OUTCOMES:

CLO 1.	The learner will be able to understand the contribution of the Lumière Brothers, Georges Méliès, Edwin S. Porter and D. W. Griffith to the history of film.
CLO 2.	The learner will be able to critically evaluate the significance of their contribution to the history of cinema through an analysis of their films.

UNIT 1	Lumière Brothers and Georges Méliès
1.1	Introduction to film studies
1.2	History of early cinema
1.3	Contribution of the specific filmmakers

UNIT 2	Edwin S. Porter and D. W. Griffith
2.1	History of early film techniques
2.2	Development of the technique of “shots”
2.3	Contribution of the specific filmmakers

REFERENCES:

1. Manley, Brian. "Moving pictures: The history of early cinema." *ProQuest Discovery Guides* (2011): 1-15.
2. Doel, Marcus. "Pivotal Film History: Georges Melies as a Vanishing Mediator." *Film-Philosophy* 6.2 (2002).
3. Staller, Natasha. "Melies'‘Fantastic’Cinema And The Origins Of Cubism." *Art History* 12.2 (1989): 202-232.
4. Eisner, Lotte H., and David D. Williams. "Films in Paris." *Cinema Journal* 14.3 (1975): 68-74.
5. McIver, Gillian. *Art history for filmmakers: The art of visual storytelling*. Bloomsbury Publishing, 2016.
6. Allan, Michael. "Deserted Histories: The Lumière Brothers, the pyramids and early film form." *Early Popular Visual Culture* 6.2 (2008): 159-170.
7. Geva, Dan, and Dan Geva. "1895: The Lumière Brothers." *A Philosophical History of Documentary, 1895–1959* (2021): 33-49.

NAME OF THE COURSE	**नाट्य एवं रंगमंच-कला**
CLASS	FYBA & FYBSc
COURSE CODE	**105B and OE204B**
NUMBER OF CREDITS	2
NUMBER OF LECTURES PER WEEK	2
TOTAL NUMBER OF LECTURES PER SEMESTER	30
EVALUATION METHOD	CONTINUOUS ASSESSMENT
TOTAL MARKS	50
PASSING MARKS	20

COURSE OBJECTIVES:

CO 1.	विद्यार्थियों में नाट्य-कला के प्रति जिज्ञासा निर्माण करना |
CO 2.	नाट्य के माध्यम से विद्यार्थियों में मौखिक और लिखित अभिव्यक्ति कौशल निर्माण करना।
CO 3.	विद्यार्थियों को आधुनिक नाटककार जयशंकर प्रसाद. मोहन राकेश, लक्ष्मीनारायण लाल, आदि से परिचित करना |
CO 4.	अभिनय-कला और रंगमच से परिचित करना तथा नाट्य लेखन में विद्यार्थियों की रुचि निर्माण करना |

COURSE LEARNING OUTCOMES:

CLO 1.	विद्यार्थियों में नाटक के माध्यम से रंगमच, अभिव्यक्ति-कला तथा नाट्य-कला का विकास होगा |
CLO 2.	नाटकों के माध्यम से वर्तमान समस्याओं, जीवन मूल्यों, तथा सामाजिक, राजनैतिक, आर्थिक, सांस्कृतिक क्षेत्रों की समझ निर्माण होगी |
CLO 3.	विद्यार्थियों में मानव-व्यवहार, कल्पनाशीलता में वृद्धि, सामूहिक सहयोग की भावना, समस्या-समाधान, स्मरण शक्ति तथा आत्मविश्वास में वृद्धि होगी |

इकाई 1	नाट्य एवं रंगमंच का परिचय
1.1	नाटक का अर्थ, परिभाषा एवं स्वरूप
1.2	नाटक के तत्व : कथावस्तु, पात्र, रंगमंच, अभिनय, रस संवाद, देशकाल / वातावरण तथा उद्देश्य
इकाई 2	नाटक - माधवी – भीष्म साहनी
2..1	नाटक - माधवी – भीष्म साहनी (पठन- पाठन)
2.2	नाट्य समीक्षा लेखन

REFERENCES:

1. माधवी – भीष्म साहनी, राजकमल प्रकाशन, दिल्ली
2. स्वातंत्र्योत्तर हिंदी नाटक - डॉ. गिरीश रास्तोगी, लोकभारती प्रकाशन इलाहाबाद
3. हिंदी नाटक आजकल- डॉ. जयदेव तनेजा, अनंग प्रकाशन, कानपुर
4. स्वातंत्र्योत्तर हिंदी नाटक- डॉ. बेचन, सन्मार्ग प्रकाशन जवाहर नगर दिल्ली, बैंगलोर रोड
5. स्वातंत्र्योत्तर नाटक मूल्य संक्रमण -ज्योतिश्वर मिश्र, लोकभारती प्रकाशन, पहली मंजिल, नई दिल्ली
6. रंगमंच के सिद्धांत- महेश आनंद एवं देवेन्द्रराज अंकुर, राजकमल प्रकाशन
7. हिंदी रंगमंच: समकालीन विमर्श -डॉ. सत्यदेव त्रिपाठी, विनय प्रकाशन
8. हिंदी नाटक- डॉ. बच्चन सिंह, लोकभारती प्रकाशन, इलाहाबाद
9. हिंदी नाटक : रंग-शिल्प, दर्शन- विकल गौतम, वाणी प्रकाशन, दरियागंज
10. समकालीन हिंदी नाटक और रंगमंच - डॉ. नरेंद्र मोहन, वाणी प्रकाशन, नई दिल्ली

NAME OF THE COURSE	**SERENDIPITY: DISCOVERIES TRIGERRED BY CHANCE**
CLASS	FYBA & FYBSc
COURSE CODE	**OE106B and OE205B**
NUMBER OF CREDITS	2
NUMBER OF LECTURES PER WEEK	2
TOTAL NUMBER OF LECTURES PER SEMESTER	30
EVALUATION METHOD	CONTINUOUS ASSESSMENT
TOTAL MARKS	50
PASSING MARKS	20

COURSE OBJECTIVES:

CO 1.	To learn about the amazing discoveries that were made accidentally.
CO 2.	To study the current status of those accidental discoveries in the current time

COURSE LEARNING OUTCOMES:
The learner will be able to:

CLO 1.	Paraphrase the important discoveries that changed the world.
CLO 2.	Evaluate what is the importance of the studied discoveries in the present times.

UNIT 1	**Discoveries in Medicine and Food (15 Lectures)**
1.1	**Discoveries in medicine** • Quinine • Smallpox vaccine • X-rays, radioactivity, pacemaker • Allergy • Antibiotic, Insulin, Penicillin

	• Pap smear • Porphyrin • Lithium injections (psychiatric disorders) • Anaesthesia • Warfarin, Thalidomide, nitrogen mustrard
1.2	**Discoveries in food** • Chocolate chip cookies, Corn flakes, potato chips, Cheese puffs • Worcestershire Sauce • Tofu • Ice-cream cones, popsicles • Pasteurization • Artificial Sweetener • Coca cola, Champagne, Brandy, Beer • Tea bags
UNIT 2	**Discoveries in Cosmetics/chemicals and polymers (15 lectures)**
2.1	**Discoveries in Cosmetics/chemicals** • Vaselin (petroleum jelly) • Botox, psoriasis therapy • Hair disorders, Permanent hair removal • Nano silk - skin treatment • Titanium dental implants • Aesthetic Dermatology • Dynamite, matches, gun powder, gun cotton • Drycleaning, mauveine
2.2	**Discoveries in Polymers** • Teflon • Superglue, sticky notes, silly putty, play dough • Safety glasses • Plastic, Cling wrap, bubble wrap

	• Vulcanized rubber, scotchgard • Polymerase chain reaction (PCR) • Smart dust • Velcro • 3D bioprinting

REFERENCES:

- https://www.vedantu.com/blog/medical-inventions-that-changed-the-world
- https://hms.harvard.edu/about-hms/history-hms/timeline-discovery
- https://www.mentalfloss.com/article/646971/inventions-that-changed-food-history
- https://www.pharmacytimes.com/view/5-surprising-stories-of-accidental-drug-discoveries
- https://www.museumofplay.org/toys/silly-putty/
- https://www.usf.edu/research-innovation/rf/usf-connect/documents/corridor/corridor_stemgenesisfeature_2016.pdf
- https://www.lexology.com/library/detail.aspx?g=c2ca3b70-b545-4121-aa95-923de6068fc0
- https://www.britishscienceweek.org/app/uploads/2015/10/NSEW-Accidental-Discoveries-Primary-PackFULLOPT.pdf
- https://www.sciencedaily.com/news/health_medicine/cosmetics/#page=2
- https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4372903/
- https://www.pbs.org/wgbh/nova/article/accidental-discoveries/
- https://www.cbsnews.com/news/botox-a-story-with-a-few-wrinkles/
- https://www.earth.com/news/cure-balding-gray-hair/
- https://www.readersdigest.ca/health/beauty/birth-botox/
- https://news.cuanschutz.edu/department-of-surgery/new-cosmetic-cream-created-at-cu-leaves-skin-silky-smooth
- https://www.linkedin.com/pulse/accidental-inventions-pacemaker-r-k-dewan-co
- https://radiantdentistry.com/blog/the-accidental-discovery-of-titanium-dental-implants
- https://www.goethe.de/prj/mis/en/mit/21902211.html
- https://www.goethe.de/prj/mis/en/mit/tte.html
- https://247wallst.com/special-report/2022/07/19/accidental-discoveries-that-changed-the-world/
- https://www.aps.org/publications/apsnews/200111/history.cfm
- https://www.thehindu.com/children/Gunning-for-guncotton/article16763412.ece

NAME OF THE COURSE	**MICROBES AND HUMAN HEALTH**
CLASS	FYBA & FYBSc
COURSE CODE	**OE107B & OE206B**
NUMBER OF CREDITS	2
NUMBER OF LECTURES PER WEEK	2
TOTAL NUMBER OF LECTURES PER SEMESTER	30
EVALUATION METHOD	CONTINUOUS ASSESSMENT
TOTAL MARKS	50
PASSING MARKS	20

COURSE OBJECTIVES:

CO 1.	To introduce and explain some important terms in context with microbes and human health.
CO 2.	To explain the relationship between microbes and the human body.
CO 3.	To outline the progress of infection to disease.
CO 4.	To provide an overview of defense mechanisms.

COURSE LEARNING OUTCOMES:

CLO 1.	The learner will be able to define several important terms.
CLO 2.	The learner will establish the harmful relationship of pathogenic microorganisms with humans.
CLO 3.	The learner will be able to construct schemes in order to explain the progress of infection to disease.
CLO 4.	The learner will be able to explain the primary, secondary and tertiary defense responses activated in the human body in response to an infection.

UNIT 1	Role of microorganisms in causing infections
1.1	a. Definition of Microbiology and Microorganisms. b. Importance of Microbiology in human health. c. Role of the microbiome in human health. d. Types of microbes that affect humans. e. Ways in which humans are infected with microbes.

1.2	a. Infection and disease: Primary and secondary infections, Contagious infections, Opportunistic pathogens, Zoonoses and Vector borne infections. b. Factors affecting infection: Hosts: Natural, Species and Racial resistance. Individual resistance. c. Microbial virulence factors in adherence, invasion, colonization and disease.
UNIT 2	Stages of infection and host defense
2.1	a. Signs and symptoms of infection b. Stages of infections: incubation, prodromal, illness, stage of decline, and convalescence c. Prevention of infections. d. Treatment of diseases using antibiotics
2.2	Host defense against infection: An Overview a. First line of defense: Skin, respiratory tract, gastrointestinal tract, genitourinary tract and eyes. b. Second line of defense: Fever, Inflammation and Phagocytosis c. Third line of defense: Brief introduction to immunity (active passive, natural and acquired)

REFERENCES:

1. Pelczar Jr, M. J.; Chan, E.C.S. & Krieg, N. R. (1986). Microbiology 5th edn. New York: Tata McGraw-Hill Education Pvt. Ltd
2. Tortora G.J., Funke, B.R., Case, C.L., 2020 Microbiology: an introduction. 13th Global edn. Pearson
3. Willey J. , Sandman K , Wood D. Prescott's Microbiology (ISE)(2019) 11th edn– McGraw-Hill Education.
4. Talaro, K. P., Chess K. 2012. Foundations in Microbiology 8th International edn, NewYork: McGraw Hill.