Department of Liberal Education
Era University, Lucknow
Course Outline
Effective From: 2023-24

Name of the Program	**B.A. / B.Sc. (LIBERAL EDUCATION)**			**Year/ Semester:**	**3rd/ 5th**
Course Name	Genetics and Gene Expression Practical	**Course Code:**	**BCH301P**	**Type:**	**Practical**
Credits	**01**			**Total Practical Hours:**	**30 Hours**
Evaluation Spread	**Internal Continuous Assesment:**	**10 Marks**		**End Term Exam:**	**15 Marks**
Type of Course	○ Compulsory	◉ Core		○ Creative	○ Life Skill
Course Objectives	The objective of this practical course is to expose the students to actual tools to study genetic traits and enable them to do hands on experiments to extract and analyze DNA.				

Course Outcomes(CO): *After the successful course completion, learners will develop following attributes:*

Course Outcome (CO)	**Attributes**
CO1	The students would be able to identify the human chromosomes and their aberration through permanent slides.
CO2	The students would be trained in drawing pedigree for analyzing inherited diseases, using history and analyzing it.
CO3	The students would learn to isolate DNA from tissues, do restriction digestion to identify and analyze the DNA which helps in detecting mutations
CO4	The students would be able to analyze blood groups, which is very common and prominent genetic inheritance marker.
Pedagogy	Interactive understanding of principles, requirements, methods and precautions and integration of classroom teaching and lab demonstration, demonstration of the methodology; self-practice and experimentation by students
Internal Evaluation Mode	Experiment-Writing and Conductance File Maintenance/ Laboratory Record Continuous Attendance and Participation

Practical No.	**Experiments**	**Contact Hours**	**Mapped CO**
1.	Study of human chromosomes and aberrations through permanent slides	**4**	**CO1**
2.	Drawing of family tree for pedigree analysis of some human inherited genetic traits.	**4**	**CO2**
3.	Chi-square analyses using seeds/beads	**4**	**CO2**
4.	Isolation of DNA from tissues	**8**	**CO3**
5.	Restriction digestion of DNA and its analysis through agarose gel electrophoresis	**4**	**CO3**

6.	Blood Group detection	**4**	**CO4**
7.	Introduction to SNP analysis e-programs	**2**	**CO2**

CO-PO and PSO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	3	2	2	2	2	2	1	3	2	2	1	2	1
CO2	3	2	1	2	2	2	2	1	3	2	2	2	2	2
CO3	3	2	2	2	2	2	2	1	3	2	3	2	2	2
CO4	3	2	3	2	2	2	2	2	3	2	2	2	2	2

Strongcontribution-3, ***Averagecontribution-2,*** ***Lowcontribution-1,***

Suggested Readings:

Text Book: 1. Genes- IX. Benjamin Lewin. Jones and Bartlett Publishers, 9th Edition 2008.
2. Cell and Molecular Biology. P.K. Gupta. 4th Edition 2014

Reference Books	1. Genetics – Classical to modern, 1st Edition. P.K. Gupta. 2013. 2. Principles of Genetics, 7th Edition, Robert H. Tamarin. 2002. Tata- McGraw Hill publications. 3. Theory and Problems of Genetics. W. D. Stansfield. 2002. McGraw Hill publications.
E-Resources	**1. Chi Square Test and Genetic Crosses:https://youtu.be/sEMZDrnuDMI** **2. Single nucleotide polymorphism marker detection, characteristics, methods: https://youtu.be/aaJkGFrWzFQ**

Internal Practical Evaluation:

Component	Marks
Experiment-Writing and Conductance	5
File Maintenance/ Laboratory Record	2
Continuous Attendance and Participation	1
Viva-Voce	2
Total Marks	10

Course created by: Dr. Ghazala Zaidi **Signature:**	**Approved by: Prof. Sudhir Mehrotra** **Signature:**