

**Veer Bahadur Singh Purvanchal University Jaunpur**  
**(Accredited A<sup>+</sup> by NAAC)**



**Pre- Ph.D. Course Work in Biotechnology**  
**(Ordinance and Syllabus)**

**(w.e.f. 2024-25)**

**(As per National Educational Policy-2020)**

*On*  
27.07.24

*27.7.24*

*27.07.2024*

*27/7/24*

*27.7.2024*

**Veer Bahadur Singh Purvanchal University, Jaunpur 222003**

Syllabus

**Pre- Ph.D. Course Work in Biotechnology**

**(Syllabus)**

**Syllabus Designed as per Guidelines of National Education Policy-2020 (NEP-2020)**

Syllabus Developed by				
Name	BoS Convener/ Member/ Experts	Designation	Department	University
Dr. Manish Kumar Gupta	Convener- BoS Biotechnology	Associate Professor	Biotechnology, Faculty of Science	Veer Bahadur Singh Purvanchal University, Jaunpur
Prof. Ashok Kumar	External Expert	Professor	School of Biotechnology, Institute of Science	Banaras Hindu University, Varanasi
Prof. Bechan Sharma	External Expert	Professor	Biochemistry, Faculty of Science	University of Allahabad, Prayagraj
Prof. Ram Naraiyan	Member	Professor	Biotechnology, Faculty of Science	Veer Bahadur Singh Purvanchal University, Jaunpur
Prof. Rajesh Sharma	Member	Professor & Head, and Dean, Faculty of Science	Biotechnology, Faculty of Science	Veer Bahadur Singh Purvanchal University, Jaunpur
Prof. Pradeep Kumar	Member	Professor	Biotechnology, Faculty of Science	Veer Bahadur Singh Purvanchal University, Jaunpur

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## Veer Bahadur Singh Purvanchal University, Jaunpur

### Pre- Ph.D. Course Work in Biotechnology (Ordinance)

As per the university Ph.D. ordinance, the research scholars who are provisionally registered for the Ph. D. Programme will undergo a Pre- Ph.D. Course work.

**Aim of the Course Work:** The aim of Pre- Ph. D. course work is to develop and enhance the research skills like **investigation, evaluation, reasoning, comprehension, analysis, writing, editing and designing**

List of all papers of Pre-Ph.D. course work or Post Graduate diploma in Research (PGDR)

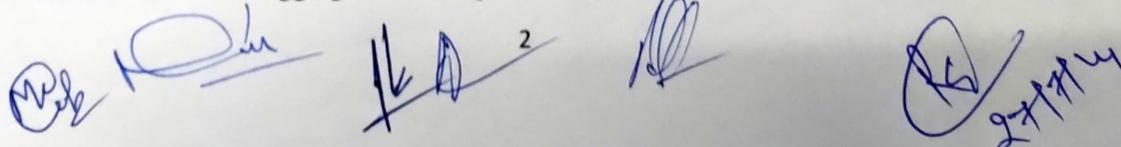
Year	Semester	Course Code	Course Type	Course Title	Theory/ Research	Credit	Max. Marks
6	XI	B101101T	Major	Fundamentals of Biotechnology	Theory	6	100 [25(CIE)+ 75(ESE)]
		B101102T	Major	Advanced Analytical Techniques	Theory	6	100 [25(CIE)+ 75(ESE)]
		B101103T	Major	Research Methodology, Research Publication Ethics and Computer Applications	Theory	4	100 [25(CIE)+ 75(ESE)]
			Qualifying	Research Project	Research	-	100 [25(CIE)+ 75(ESE)]

#### Course prerequisites

As per the university ordinance, the research scholars who are provisionally registered for the Ph. D. Programme will undergo a Pre- Ph.D. Course work.

#### Eligibility

1-year/2-semester master's degree programme after a 4-year/8-semester bachelor's degree programme (with Research) or a 2-year/4-semester master's degree programme after a 3-year bachelor's degree programme or qualifications declared equivalent to the master's degree by the corresponding statutory regulatory body in **Biotechnology/ Microbiology / Biochemistry / Zoology / Botany/ Biochemical Engineering / Biomedical Engineering / Biological Sciences and Bioengineering / Life Sciences / Bioinformatics / Agriculture Science / Medicine / Pharmacy / Veterinary Science and Animal Husbandry/ Food Technology or relevant allied Sciences**, with at least 55% marks in aggregate or its equivalent grade in a point scale wherever grading system is



followed or equivalent qualification from a foreign educational institution accredited by an assessment and accreditation agency which is approved, recognized or authorized by an authority, established or incorporated under a law in its home country or any other statutory authority in that country to assess, accredit or assure quality and standards of the educational institution.

**Credit system:**

- A four (4) credit theory course/paper will have four Lectures/periods (of one hour) in a week. In one full semester the course will be covered in 60 Lectures.
- Similarly, a six (6) credit theory course/paper will have six Lectures/periods (of one hour) in a week. In one full semester the course will be covered in 90 Lectures.

**Continuous Internal Evaluation (CIE) of 25 marks:**

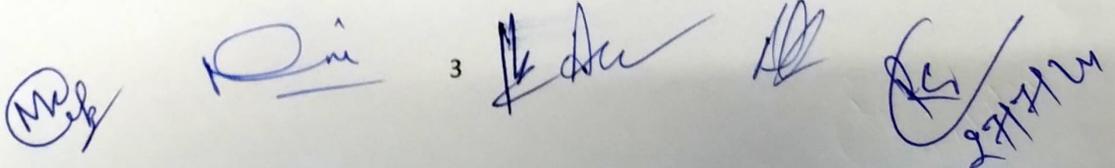
- Continuous internal evaluation will be performed by the teacher/ course coordinator concerned.
- CIE shall be 25% of total assessment in a Theory paper as well as research project.
- 25 marks shall be distributed as 5 marks for attendance, 5 marks for presentation and assignment and remaining 15 marks for class test.

**Marking system:**

- All papers will have a total maximum mark of 100, including both CIE and End Semester Examination (ESE). Maximum marks of 25 will be allotted to CIE and 75 to ESE in a theory paper/ research project.
- The CIE of the research project shall be evaluated by the research Supervisor and Co-supervisor (if any).
- 75 marks of **research project** shall be distributed as 50 marks (project work and presentation) and a viva voce of 25 marks.
- The evaluation seventy-five (75) marks shall be End Semester Examination (ESE) of the research project shall be done by internal examiner/s (Supervisor and Co-supervisor (if any)) and one external examiner appointed by the University or as per the directives of the University.

**Research Project Submission:**

- The evaluated research project report in two sets of hard copy (spiral binding) must be prepared. One copy of it shall be submitted to the university if it demands. A second

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copy of the evaluated research project report must be in the records of the college/research centre.

- The format of university Ph.D. thesis writing guidelines can be used as format of Research project writing guidelines.
- The format of the question paper and evaluation will be as per the Ph.D. ordinance of the Veer Bahadur Singh Purvanchal University, Jaunpur.

### 10-point grading system for evaluation of the Pre-Ph.D. course work

As per the UP GOs 1567/सत्तर-3-2021-16 (26)/2011 TC dated 13 July 2021, 401/सत्तर-3-2022, dated 09 Feb. 2022, and 1032/सत्तर-03-2022-08(35)/2020, dated 20 April 2022 regarding NEP-2020, the grading system for the Pre-Ph.D. course work shall be followed as given in table -1

Table-1

Letter Grade	Details	Limit of Marks	Grade Point
O	Outstanding	91-100	10
A+	Excellent	81-90	9
A	Very Good	71-80	8
B+	Good	61-70	7
B	Above Average	55-60	6
F	Fail	<55	0
AB	Absent	Absent	0
Q	Qualified		
NQ	Not Qualified		

In pre-Ph.D. course work, there is a mandatory research project that is qualifying in nature. This research project shall be a **non-credit course**. The letter grade for the research project will be Q or NQ. The grade of research project will not be included in the computations of the CGPA.

**Computation of CGPA:**

Calculations for SGPA and CGPA shall be followed as given table 2:

**Table 2**

For $j^{\text{th}}$ Sem. $\text{SGPA } (S_j) = \frac{\sum C_i \cdot G_i}{\sum C_i}$	Here: $C_i$ = number of credits of the $i^{\text{th}}$ course in the $j^{\text{th}}$ semester $G_i$ = grade point scored by the student in the $i^{\text{th}}$ course in $j^{\text{th}}$ semester
$\text{CGPA} = \frac{\sum C_j \cdot S_j}{\sum C_j}$	Here: $S_j$ = SGPA of the $j^{\text{th}}$ semester $C_j$ = total number of credits in the $j^{\text{th}}$ semester

**Allocation of CGPA Into Division:**

The allocation of CGPA into division in pre-Ph.D. course work follows as given in Table 3:

**Table 3**

Division	CGPA
First	Greater than or equal to 6.5 and less than or equal to 10
Second	Greater than or equal to 5.5 and less than 6.5

Five handwritten signatures in blue ink are present below the table. From left to right: a circular signature, a signature starting with 'K', a signature starting with 'H', a signature starting with 'A', and a signature starting with 'S'.

**Pre- Ph.D. Course Work in Biotechnology  
(Syllabus)**

<b>Programme/Class:</b> Post Graduate Diploma in Research(PGDR)	<b>Year:</b> Six (6)	<b>Semester:</b> XI
<b>Course Code:</b> B101101T	<b>Course Title: Fundamentals of Biotechnology</b>	
<b>Credits:</b> 6	<b>Major/Core</b>	
<b>Course Outcomes (COs)</b>		
This course introduces the principles of cell biology and after completion of this course, students will be able to;		
<b>CO 1:</b> understand the chemical basis of life, composition of living matter, chemical foundations of biology and biomolecular hierarchy <b>CO 2:</b> understand chemical and internal organization of cells, chromatin organization and molecular biology of the cell. <b>CO 3:</b> understand scope of microbiology: physical and chemical methods for control of microorganisms. <b>CO 4:</b> understand the different types of immune system, their regulation and advance techniques of Immunology. <b>CO 5:</b> understand tools and techniques of recombinant DNA technology and Impact of genetic engineering in modern society. <b>CO 6:</b> understand the fundamentals and applications of bioinformatics and protein analysis		
<b>Unit</b>	<b>Topics</b>	<b>No. of Lectures (Hr)</b>
<b>I</b>	Introduction to biochemistry and biomolecules. Properties of and role of water in biological systems, role of pH and buffers. Introduction to Oligomeric and polymeric enzyme.	15
<b>II</b>	Genomic organization of prokaryotic and eukaryotic systems. Replication, Transcription in prokaryotes and eukaryotes. Types of RNA, Genetic code, Post transcriptional modification. Translation in prokaryotes and eukaryotes.	15
<b>III</b>	Introduction, history & scope of microbiology, growth and nutrition of bacteria, bacterial growth curve, bacterial culture methods; Important industrial application of microorganism. antimicrobial resistance and their solution.	15
<b>IV</b>	Innate and acquired immunity; Immunoglobulins - basic structure, classes & subclasses of immunoglobulins. Traditional and Recombinant Vaccine. Immunization program of Government of India	15
<b>V</b>	Introduction to Genetic Engineering, Role of Enzymes in Genetic Engineering; Cloning techniques, DNA delivery methods; Homologous and heterologous expression. DNA	15

	sequencing methods, DNA fingerprinting, foot printing and its applications.	
VI	Biological databases, Primary & Secondary database, Sequence file formats, Structure file formats. Sequence similarity of search Program using BLAST and MUSCLE. Phylogenetic analysis. Protein modeling by Homology. Computer aided drug designing and molecular docking.	15

**Suggested Reading**

1. Nelson DL, Cox MM, Hoskins A A . (2021) Lehninger Principles of Biochemistry, 8th Edition. WH Freeman & Co., New York.
2. Berg JM, Tymoczko JL, Gatto GJ and Stryer L (2015) Biochemistry, 8th Edition, WH Freeman & Co., New York.
3. Lodish H, Berk A, Kaiser CA, Kreiger M, Bretscher A, Ploegh H, Martin KC, Yaffe MD, Amon A.(2021). Molecular Cell Biology 9th Edition. WH Freeman & Co., New York.
4. Alberts B, Heald R, Johnson A, Morgan D, Raff M, Roberts K, Walter P(2022). Molecular Biology of the Cell 7th Edition. Garland Science, Taylor & Francis Group New York.
5. Punt J, Stranford SA, Jones PP Owen JA. (2019) Kuby Immunology, 8th Edition. WH Freeman & Co., New York.
6. Delves PJ, Martin SJ, Burton DR, Roitt IM, (2017). Roitt's Essential Immunology 13th edition John Wiley & Sons, Ltd, UK
7. Abbas AK, Lichtman AH, Pillai S. (2021) Cellular and Molecular Immunology 10th edition, Elsevier.
8. Brown TA (2018) Genomes 4 Garland Science, Taylor & Francis Group New York
9. Brown TA (2020) Gene Cloning and DNA Analysis: An Introduction. 8th Edition. John Wiley and Sons, Ltd.
10. Mount, D. W. (2004). Bioinformatics: Sequence and Genome Analysis. Cold Spring Harbor, NY: Cold Spring Harbor Laboratory Press
11. Baxevanis, A. D., & Ouellette, B. F. (2001). Bioinformatics: a Practical Guide to the Analysis of Genes and Proteins. New York: Wiley-Interscience.
12. Prescott, Harley & Klein's Microbiology, – Willey, Sherwood and Woolverton. Pub:McgrawHill, International Ed.
13. General Microbiology – R.Y. Stanier, J.L Ingraham, M.L. Wheelis, P.R. Painter, Pub: The MacMillan Press Ltd.

**Suggested Digital platform/Web link**

1. <https://www.youtube.com/watch?v=uDXH6Uu0ghc>
2. [https://www.youtube.com/watch?v=kVu37T6sB\\_E](https://www.youtube.com/watch?v=kVu37T6sB_E)
3. <https://www.youtube.com/watch?v=JuwErrBz3b4>
4. <https://www.youtube.com/watch?v=2JUu1WqidC4>
5. <https://www.youtube.com/watch?v=sREv4rfpbCY&list=PLoNoar1DIEiltg7qYV5N-3846Pu1O2BAG>
6. <https://www.youtube.com/watch?v=Dyv6YiH5rME&list=PLECA78684C931E6B7>
7. [https://www.youtube.com/watch?v=777y-XCHWlc&list=PLJoALJA\\_KMOCLX\\_4GKqeEiG11tDeeGX3N](https://www.youtube.com/watch?v=777y-XCHWlc&list=PLJoALJA_KMOCLX_4GKqeEiG11tDeeGX3N)
8. <https://www.youtube.com/watch?v=Bhe6Tj2Ebys>
9. <https://www.youtube.com/watch?v=3QHA698oMXw&list=PLvqSpQzTE6M93irerMnIZWfAsx5kU9vRI>
10. <https://www.youtube.com/watch?v=haO3ChM2wUs&list=PLvqSpQzTE6MJgOPBvDus1CRmpR6Pwq1W>

<b>Programme/Class:</b> Post Graduate Diploma in Research(PGDR)	<b>Year:</b> Six (6)	<b>Semester:</b> XI
<b>Course Code:</b> B101102T	<b>Course Title: Advanced Analytical Techniques</b>	
<b>Credits:</b> 6	<b>Major/Core</b>	
<b>Course Outcomes (COs)</b>		
On successful completion of this course, student will be able to;		
<ol style="list-style-type: none"> <li>1. Execute the techniques used for enzyme assay, Kinetic assay, protein assay, nucleic acid assay and structural studies</li> <li>2. understand principles and types of centrifugation and principles &amp; applications in biochemical fractionation methods in biological analysis</li> <li>3. Describe the basic principle and application of chromatography and X-ray crystallography in biotechnology</li> <li>4. Understand DNA cloning, Polymerase Chain Reaction and genome editing technology.</li> <li>5. Describe microbial growth and kinetics, methods for identifying microbes and different types of microscopy</li> <li>3. understand the basic principle and applications of different types of electrophoresis.</li> </ol>		

<b>Unit</b>	<b>Topics</b>	<b>No. of Lectures (Hr)</b>
<b>I</b>	Principles and Applications of spectroscopy, enzyme assay, Optical rotatory dispersion and Circular Dichroism. Instrumentation and applications of ESR, NMR; IR-Raman Spectroscopy in biology.	15
<b>II</b>	Principle, types and applications of centrifugation. Cell disruption and fractionation of organelles; Isolation and purification of proteins;	15
<b>III</b>	Principal, Types and Applications of Chromatography, X-ray crystallography and Xray diffraction.	15
<b>IV</b>	Principle, types and applications of Polymerase Chain Reaction, blotting techniques, Gene and Genome Editing Techniques, Microarray.	15
<b>V</b>	Principle, types and applications of microscopy.	15
<b>VI</b>	Principles, types and applications of electrophoretic techniques, Immunological techniques	15

### Suggested Reading

1. Cantor, C. R., and Schimmel, P. R. (1980). Biophysical Chemistry Vol. I, II & III. W. H. Freeman and Company.
2. Nelson DL, Cox MM, Hoskins AA. (2021) Lehninger Principles of Biochemistry, 8th Edition. WH Freeman & Co., New York.
3. Berg JM, Tymoczko JL, Gatto GJ and Stryer L (2015) Biochemistry, 8th Edition, WH Freeman & Co., New York.
4. Plummer DT (2017) an Introduction to Practical Biochemistry 3rd Edition. Tata McGraw Hill
5. Hofmann A and Clokie S. (2018). Wilson and Walker's Principles and Techniques of Biochemistry and Molecular Biology 8th Edition. Cambridge Univ. Press, (U.K.)
6. Lodish H, Berk A, Kaiser CA, Kreiger M, Bretscher A, Ploegh H, Martin KC, Yaffe MD, Amon A.(2021). Molecular Cell Biology 9th Edition. WH Freeman & Co., New York.
7. Alberts B, Heald R, Johnson A, Morgan D, Raff M, Roberts K, Walter P(2022). Molecular Biology of the Cell 7th Edition. Garland Science, Taylor & Francis Group New York.
8. Sambrook J Green MR(2012). Molecular Cloning : A laboratory Manual -1, 4<sup>th</sup> edition. Cold Spring Harbor Laboratory Press, Cold Spring Harbor, New York.
9. Sambrook J Green MR(2012). Molecular Cloning : A laboratory Manual -2, 4<sup>th</sup> edition. Cold Spring Harbor Laboratory Press, Cold Spring Harbor, New York.
10. Sambrook J Green MR(2012). Molecular Cloning : A laboratory Manual -3, 4<sup>th</sup> edition. Cold Spring Harbor Laboratory Press, Cold Spring Harbor, New York.
11. Barker K.(2005). At the bench a laboratory navigator 2<sup>nd</sup> Edition. Cold Spring Harbor Laboratory Press, Cold Spring Harbor, New York.
12. Hay FC Westwood OMR(2008). Practical Immunology 4<sup>th</sup> Edition. John Wiley & Sons, Inc.
13. Cappuccino J Sherman Natalie (2014). Microbiology a laboratory manual 10<sup>th</sup> Edition. Pearson Education India.
14. Levinson W, Chin Hong P, Joyce EA, NussbaumJ, Schwartz B(2017) Review of clinical infectious diseases 17<sup>th</sup> Edition. Mcgraw Hill/ Medical India

### Suggested link

1. [https://www.youtube.com/watch?v=n18jMutR\\_z0&list=PLbMVogVj5nJQnmDi4vK8EYwQvNoL\\_vSRU](https://www.youtube.com/watch?v=n18jMutR_z0&list=PLbMVogVj5nJQnmDi4vK8EYwQvNoL_vSRU)
2. [https://www.youtube.com/watch?v=gaBXQW9rCDA&list=PLbMVogVj5nJQnmDi4vK8EYwQvNoL\\_vSRU&index=14](https://www.youtube.com/watch?v=gaBXQW9rCDA&list=PLbMVogVj5nJQnmDi4vK8EYwQvNoL_vSRU&index=14)
3. [https://www.youtube.com/watch?v=BM9qQ\\_sHWP8&list=PLbMVogVj5nJQnmDi4vK8EYwQvNoL\\_vSRU&index=21](https://www.youtube.com/watch?v=BM9qQ_sHWP8&list=PLbMVogVj5nJQnmDi4vK8EYwQvNoL_vSRU&index=21)
4. [https://www.youtube.com/watch?v=jn8iT31w9s4&list=PLbMVogVj5nJQnmDi4vK8EYwQvNoL\\_vSRU&index=29](https://www.youtube.com/watch?v=jn8iT31w9s4&list=PLbMVogVj5nJQnmDi4vK8EYwQvNoL_vSRU&index=29)
5. [https://www.youtube.com/watch?v=o8zELwp358A&list=PLbMVogVj5nJQnmDi4vK8EYwQvNoL\\_vSRU&index=34](https://www.youtube.com/watch?v=o8zELwp358A&list=PLbMVogVj5nJQnmDi4vK8EYwQvNoL_vSRU&index=34)
6. [https://www.youtube.com/watch?v=etpSw6xfLmM&list=PLbMVogVj5nJQnmDi4vK8EYwQvNoL\\_vSRU&index=40](https://www.youtube.com/watch?v=etpSw6xfLmM&list=PLbMVogVj5nJQnmDi4vK8EYwQvNoL_vSRU&index=40)
7. [https://www.youtube.com/watch?v=fzMXboYnp5s&list=PLbMVogVj5nJQnmDi4vK8EYwQvNoL\\_vSRU&index=41](https://www.youtube.com/watch?v=fzMXboYnp5s&list=PLbMVogVj5nJQnmDi4vK8EYwQvNoL_vSRU&index=41)

### Suggested Digital platform/Web link

1. <https://www.youtube.com/@iit>
2. <https://onlinecourses.nptel.ac.in/>
3. <https://epgp.inflibnet.ac.in/>
4. <https://heecontent.upsdc.gov.in/Home.aspx>

### Suggested equivalent online courses

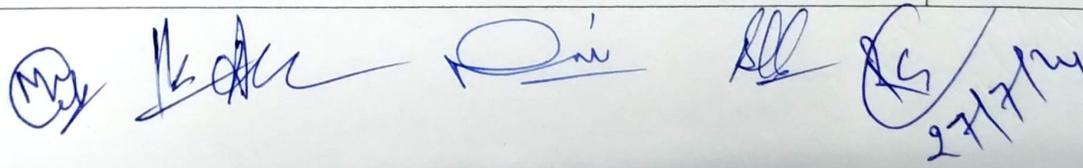
<https://onlinecourses.nptel.ac.in/>

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<b>Programme/Class:</b> Post Graduate Diploma in Research(PGDR)	<b>Year:</b> Six (6)	<b>Semester:</b> XI
<b>Course Code:</b> B101103T	<b>Course Title: Research Methodology, Research Publication Ethics and Computer Applications</b>	
<b>Credits:</b> 4	<b>Major</b>	
<b>Course Outcomes (COs)</b>		
<p><b>CO1:</b> With the help of this course, students will be able to decide the research field, topic, design, and pros and cons of research, sampling, and data collection techniques.</p> <p><b>CO2:</b> The student will be able to understand the research process and acquire the skill of writing research articles.</p> <p><b>CO3:</b> The course will enable you to execute the best practices, morals, and ethical values in scientific conduct and avoid publication misconduct.</p> <p><b>CO4:</b> With the help of this course, students will be able to learn about the standards of journals for good-quality publications of their research work.</p> <p><b>CO5:</b> After this course, the students will be able to learn how to use computers and different application software for manuscript writing.</p> <p><b>CO6:</b> This course will enable the students to learn about reference management and the maintenance of academic integrity using scientific tools. They will be familiar with the protection of the machines from computer hazards.</p>		

Unit	Topics	No. of Lectures (Hr)
<b>I</b>	<b>Research Methodology</b> Definition, and Objectives, Motivation and Significance of Research, Types of Research, Truth and Facts of Research, Similarity and Contrast in Literary Research and Scientific Research, Research and Criticism, Research Problem and Research Design, Sampling Design and Methods of Data Collection.	<b>12</b>
<b>II</b>	<b>Research standards:</b> Layout of the Research Report, Research Process: subject Selection, Outline of the Research, Review of Literature, Material Collection; Testing and Classification, Analysis, Discussion and Conclusions, Precautions in Writing Synopsis/Research Paper/Thesis/Research Report.	<b>12</b>
<b>III</b>	<b>Philosophy, Ethics, Scientific Conducts and misconducts</b> Moral Philosophy, Nature of Moral Judgments and Reactions, Publication Ethics, Best Practices/Standards Setting Initiatives and Guidelines: Committee on Publication Ethics (COPE), World Association of Medical Editors (WAME) etc., Intellectual Honesty and Research Integrity: Falsification, Fabrication and Plagiarism (FFP), Open Access Publishing, and Publication Misconduct.	<b>12</b>



IV	<b>Databases and Research Metrics</b> Databases: Indexing Databases, Citation Databases: Web of Science, Scopus etc., Research Metrics: Impact Factor of Journal as Per Journal Citation Report, SNIP, SJR, IPP, Cite Score; Metrics: h-Index, g-Index, i-10 Index, and Altmetric.	12
V	<b>Fundamentals of Computers and application Softwares</b> Types Of Computers, Computer Peripherals and internal component, Types of Operating Systems, Web Browser, Web Search Engine, Spreadsheet Processing, Presentation (MS PowerPoints Preparation or Beamer or Libre Office (Optional), Project/Thesis/Report writing, Using MS-Word or LaTeX or LibreOffice documentation style Labelling, References Style, Footnotes etc.	12
VI	<b>Scientific Softwares</b> Use of Reference Management Software Like Mendeley, Zotero, Reference Manager, Endnote, Authorea Etc. Anti-Plagiarism Software Like Turnitin, iAuthenticate, Urkund, Ebooks and Virtual Library, UGC-Infonet, Computer Hazards and Security	12

**Suggested Reading**

1. C.R. Kothari, Research methodology Methods and Techniques, 4<sup>th</sup> Edition, New Age Internation (P) Ltd. Publisher, 2014.
2. W. Creswell, Research Design, Qualitative, Quantitative and mixed method approaches, 3 Edition, Sage Publications, Inc.
3. D.B. Resnik, (2011) What is ethics in research & Why is it important. National institute Environmental Health Science, 1-10 Retrieved fro <https://www.niehs.nih.gov/research/resources/bioethics/whatis/index.cfm>
4. Indian National Science Academy (INSA), Ethics in Science Education, Research and Governan (2019), ISBN:978-81-939482-1-7. [https://www.insaindia.res.in/pdf/Ethics\\_Book.pdf](https://www.insaindia.res.in/pdf/Ethics_Book.pdf)
5. Reema Thareja (2019) Fundamentals Of Computers (2<sup>nd</sup> Edition), Oxford University Press
6. Microsoft Office 365 : A complete Guide to Master Word, Excel, and PowerPoint 365 f Beginners, Matt Vic

lie Lamport, LaTeX, A Document Preparation System, 2<sup>nd</sup> Edition, Addison-Wesl Professional Publisher, July, 1994.

ex tutorials <https://www.tug.org/twg/mactex/tutorials/ltxprimer-1.0.pdf>

re Office tutorial: [www.documentation.libreoffice.org/en/english-documentation](http://www.documentation.libreoffice.org/en/english-documentation)

**Suggested equivalent online courses**

<https://epgp.inflibnet.ac.in/>

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<b>Programme/Class:</b> Post Graduate Diploma in Research (PGDR)	<b>Year:</b> Six (6)	<b>Semester:</b> XI
<b>Course Code:</b> B101104TR	<b>Course Title:</b> Research Project	
<b>Credits:</b> Non-Credit	<b>Qualifying</b>	
<b>Course Outcomes (COs)</b>		
On successful completion of this course, student will be able to;		
CO1: write a research project		
CO2: carry out a research project		
CO3: analyse data and synthesize research findings		
CO4: report research findings in written and verbal forms		
CO5: publish research findings		
CO6: use research findings to advance theory and practice		
<b>Suggested Reading</b>		
1. Berry R(2004). The Research Project How to Write It, 5 <sup>th</sup> edition. Routledge New York		
2. Thomas G(2017). How to Do Your Research Project: A Guide for Students 3 <sup>rd</sup> Edition.Sage Publications Ltd.		
<b>Suggested equivalent online courses</b>		
<a href="https://epgp.inflibnet.ac.in/">https://epgp.inflibnet.ac.in/</a>		