



SHAHEED NANDKUMAR PATEL VISHWAVIDYALAYA, RAIGARH (C.G.)

(A State University Established under Chhattisgarh Vishwavidyalaya Adhiniyam. 1973)

Scheme and Syllabus

of

Bachelor of Science

(Year – Second)

W.E.F. Session :- 2024-25

Syllabus Approved by the Central Board of Studies

Scheme of B.Sc./ B.Sc. (Hons.) Biotechnology

Year	Course Code	Subject Name	Theory/ Practical	Total Credit	Total Marks	
					Max	Min
Second year	BIOT-3T	Molecular Biology and Biophysics	Theory	4	50	17
	BIOT-4T	Recombinant DNA Technology and Genomics	Theory	4	50	17
	BIOT-2P	LAB 2: Molecular Biology, Bioinstrumentation, and Genomics <small>Food and Industrial</small>	Practical	2	50	17

Note: There shall be four extra credits in each year for internship/apprenticeship. The certificate of extra credits for this would be provided by the university concern.

Signature

Signature
Dr. Lalit P. Singh
 अध्यक्ष

अध्ययन मंडल
 शाहीद संदकुमार पटेल
 विद्यालय, रायचूर (उ.प्र.)

Part A: Introduction			
Program: Diploma Course		Class: B.Sc. II Year	Year: 2023 Session: 2023-2024
1	Course Code	BIOT-3T	
2	Course Title	Molecular Biology and Biophysics	
3	Course Type	Theory	
4	Pre-requisite (if any)	As per Govt. norms	
5	Course Learning Outcomes (CLO)	At the end of this course, the students will be able to: <ul style="list-style-type: none"> • Understand on fundamentals of molecular biology and instrumentation • Understand the concept of tools applied in the study of biotechnology • Understand the expression of gene 	
6	Credit Value	Theory: 4	
7	Total Marks	Max. Marks: 50	Min Passing Marks: 17

Part B: Content of the Course		
Total No. of Teaching – Periods- 60 / Hours – 40		
Unit	Topics	No. of Period / Hour
1	1. Nucleic Acid: Bases, Nucleosides and Nucleotides, Structure, types and functions of DNA and RNA. 2. Structure, types and functions of Plasmids. 3. Transposons: Repetitive elements, Retro-transposons, LINEs & SINEs, Structure of Gene.	12 Periods / 08 Hours
2	1. DNA Replication: Enzymes involved and mechanism of DNA Replication in Prokaryotes. 2. Mutation: Molecular level of Mutation, Types of Mutagens, Spontaneous and Induced Mutation. 3. DNA Repair: Direct, NER, BER, Mismatch and Recombination.	12 Periods / 08 Hours
3	1. Transcription: Initiation, Elongation and Termination in prokaryotes. 2. Genetic Code: Features, Codon Assignment and Wobble hypothesis 3. Translation: Initiation, Elongation and Termination Translation machinery in Prokaryotes. 4. Operon- Concept of Operator, Regulator, Promoter gene, Inducer and Co-repressor.	12 Periods / 08 Hours
4	1. Biophysics : Introduction, Scope and Application 2. Principle, Types, Instrumentation and Functions of the following: a. Microscope b. Colorimeter and UV-VIS Spectrophotometer c. Electrophoresis (Agarose and PAGE) d. Centrifuge e. Chromatography (Paper, TLC and HPLC).	12 Periods / 08 Hours
5	1. Radioisotopes techniques: Radioactive decay, Measurement of radioactivity, Ionization Chambers, Geiger Muller and Scintillation Counter. 2. Autoradiography, DNA Fingerprinting, 3. Blotting techniques: Southern Northern and western blotting.	12 Periods / 08 Hours
Keywords: DNA, RNA, Replication, Transcription, Translation, Bioinstruments, Biophysics		

DNCCM

DR. K. K. Patel
 अध्यक्ष

संयोजक प्रोफेसर
 राष्ट्रीय संवर्धन परिषद
 विचारलय, रायपुर (छ.ग.)

Part C - Learning Resource		
Text Books, Reference Books, Other Resources		
Suggested Readings:		
1. Gerald Karp - Cell and Molecular biology, 4th Edition (2005). 2. Lewis J.Klein Smith and Valerie M.Kish-Principles of cell and molecular biology-Third Edition (2002) 3. P.K. Gupta- Cell and molecular biology, Second Edition (2003), Rastogi publications. 4. Richard M-Twyaman-Advanced Molecular Biology, First South Asian Edition (1998), VivaBooks Pvt. Ltd. 5. K. Wilson and J. Walker (2012) Principle and Techniques of Biotechnology and Molecular Biotechnology. 6. DSVGK Kaladhar, Molecular Biochemistry (2018) RBSA Publishers ISBN 9788176117708. 7. Upadhy and Upadhy : Biophysical Chemistry. 8. David, I. Nelson and Michael M.Cox :Lehninger : Principal of Biochemistry 4th Edition. W.H. Freeman and Company, New York. 9. Buchanan, Gruissemen & Jones (2015) Biochemistry & Molecular Biology of Plant, 2nd edition.		
E-learning Resources		
https://ncert.nic.in/textbook/pdf/lech205.pdf https://www.pdfdrive.com/biomolecules-books.html https://swayam.gov.in/ https://www.edx.org/search?q=biomolecules&tab=course https://britannica.com https://en.wikibooks.org/wiki/Biochemistry https://nptel.ac.in		
Part D: Assessment and Evaluation		
Suggested Continuous Evaluation Methods:		
Maximum Marks: 50		
Continuous Comprehensive Evaluation (CCE): Not Applicable		
University Exam(UE): 50 Marks		
Internal Assessment: Continuous Comprehensive Evaluation (CCE)	Class Test/Assignment/Presentation	Not Applicable
External assessment University Exam (UE)		As per Govt. norms
Time 3Hours		
Any remarks/ Suggestions: -		

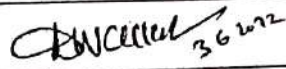
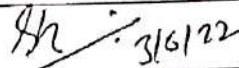
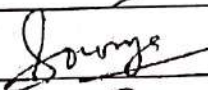
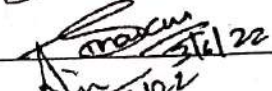
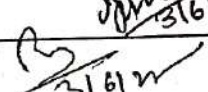
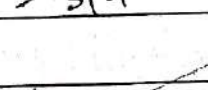
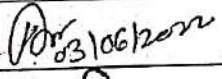
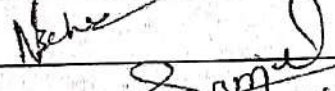
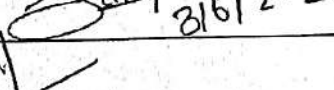
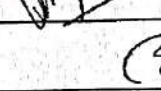
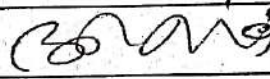
Enclosed


Dr. K. R. Patel

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Declaration

Syllabus is framed as per the ToR

Name	Signature
Dr DSVGK Kaladhar, Prof & Chairperson CBoS Biotechnology, UTD ABVV	 3/6/22
Dr Pramod Kumar Mahish, Asst. Professor Govt. Digvijay College Rajnandgaon	 3/6/22
Dr Saumya Khare, Asst Prof, Kalyan PG. College Bhilai	
Dr Shubha Thakur, Asst Prof, St. Thomas College Bhilai	 3/6/22
Dr Akanksha Jain, Asst Prof. Shri Shankaracharya Mahavidyalaya, Bhilai	 3/6/22
Dr Arun Kumar Kashyap, Asst Professor, Govt. E raghavendra Rao PG. Science College Bilaspur	 3/6/22
Dr Tarun Kumar Patel, Asst Professor, Sant Guru Ghasidas PG. College Kurud	 03/06/2022
Dr Neha Behar, Asst Prof. DLS PG. College Bilaspur	
Dr Sanjana Bhagat, Asst Prof. Govt Ngarjuna PG. Science College, Raipur	 3/6/22
Dr Kamlesh Shukla, PRSU, Raipur	
Dr Ashish Kumar, Sant Gahira Guru Vishwavidyalay Sarguja	


 Dr. Ashish Kumar
 प्रमुख, रायगढ़ (उ.ग.)
 विद्यालय, रायगढ़ (उ.ग.)

Part A: Introduction			
Program: Diploma Course	Class: B.Sc. II Year	Year: 2023	Session: 2023-2024
1	Course Code	BIOT-4T	
2	Course Title	RECOMBINANT DNA TECHNOLOGY AND GENOMICS	
3	Course Type	Theory	
4	Pre-requisite (if any)	As per Govt. norms	
5	Course Learning Outcomes (CLO)	At the end of this course, the students will be able to: <ul style="list-style-type: none"> • Understand the fundamentals of Genetic engineering and biological databases • learn the basic techniques of RDT • Understand the concept of genomics 	
6	Credit Value	Theory: 4	
7	Total Marks	Max. Marks: 50	Min Passing Marks: 17

Part B: Content of the Course		
Total No. of Teaching – Periods- 60 / Hours – 40		
Unit	Topics	No. of Period / Hour
1	1. Recombinant DNA technology: General concept. Steps in gene cloning and application. 2. Restriction Modification System, Ligases and Polymerases, Klenow fragment, Taq, Pfu polymerase and Nuclease (Endo, Exo and restriction endonuclease). 3. Modification Enzyme (Kinase, Phosphates and terminal deoxynucleotidyl transferase). Reverse Transcriptase.	12 Periods / 08 Hours
2	1. Vectors: Plasmid, Bacteriophages, Cosmid, Phagemid, BAC, YAC and Expression vectors. 2. Gene Library: Genomic and cDNA library. 3. Selection and Screening of Recombinants: Genetic (Blue White Screening) and Hybridization methods- Colony hybridization and immunoblotting.	12 Periods / 08 Hours
3	1. PCR: Types of PCR, Steps (Denaturation, Annealing and Extension); Applications, Advantages and Limitation of PCR. 2. Molecular Marker-RFLP, RAPD, AFLP, SSR SNP. 3. Site Directed Mutagenesis, Gene Silencing (siRNA, miRNA)	12 Periods / 08 Hours
4	1. Basic concept of Gene Transfer Methods: Microinjection, Electroporation, Lipofection. 2. Gene Therapy: In vivo and Ex vivo, Germ line and Somatic gene therapy. 3. Basic idea of Stem cell technology: Types of stem cell cultures and their Significance.	12 Periods / 08 Hours
5	1. Basic concept of Genomics: Structural and Functional Genomics 2. Shot Gun and Whole Genome Sequencing 3. Comparative Genomics: RT-PCR, SAGE, Microarray 4. Human Genome Project.	12 Periods / 08 Hours
Keywords: Genetic engineering, Gene therapy, Bioinformatics, Genomics, Molecular Markers, PCR		


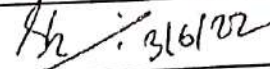
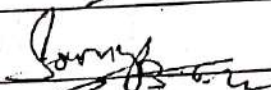
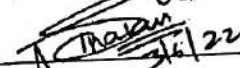
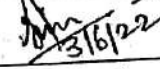
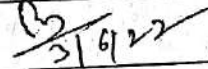
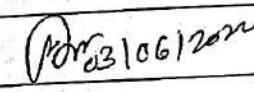
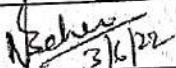
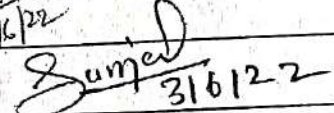
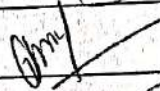
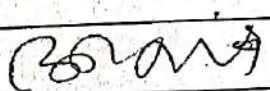
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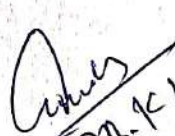
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DR. K. K. P. K.

श्री. विद्यालय, रायचूर (ड. 7)

Declaration

Syllabus is framed as per the ToR

Name	Signature
Dr DSVGK Kaladhar, Prof & Chairperson CBoS Biotechnology, UTD ABVV	 3/6/22
Dr Pramod Kumar Mahish, Asst. Professor Govt. Digvijay College Rajnandgaon	 3/6/22
Dr Saumya Khare, Asst Prof, Kalyan PG. College Bhilai	 3/6/22
Dr Shubha Thakur, Asst Prof, St. Thomas College Bhilai	 3/6/22
Dr Akanksha Jain, Asst Prof. Shri Shankaracharya Mahavidyalaya, Bhilai	 3/6/22
Dr Arun Kumar Kashyap, Asst Professor, Govt. E raghavendra Rao PG. Science College Bilaspur	 3/6/22
Dr Tarun Kumar Patel, Asst Professor, Sant Guru Ghasidas PG. College Kurud	 23/06/2022
Dr Neha Behar, Asst Prof. DLS PG. College Bilaspur	 3/6/22
Dr Sanjana Bhagat, Asst Prof. Govt Ngarjuna PG. Science College, Raipur	 3/6/22
Dr Kamlesh Shukla, PRSU, Raipur	
Dr Ashish Kumar, Sant Gahira Guru Vishwavidyalay Sarguja	


DR. K.K. Patel
 अध्यक्ष
 ज्ञान मंडल
 शाहीद चंद्रकुमार पटेल
 विद्यालय, रायगढ़ (छ.ग.)

Part A: Introduction			
Program: Diploma Course		Class: B.Sc. II Year	Year: 2023 Session: 2023-2024
1	Course Code	BIOT-2P	
2	Course Title	LAB 2: Molecular Biology, Bioinstrumentation, and Genomics	
3	Course Type	Practical	
4	Pre-requisite (if any)	As per Govt. norms.	
5	Course Learning Outcomes (CLO)	At the end of this course, the students will be able to: <ul style="list-style-type: none"> • Understand on fundamentals of Recombinant DNA Technology. • Understand on estimation of DNA and RNA. • Understand on the concept of bioinformatics 	
6	Credit Value	Practical: 2	
7	Total Marks	Max. Marks: 50	Min Passing Marks : 17

Part B: Content of the Course	
Total No. of Teaching Hours – 20 / 30 Periods	
Tentative Practical List	<p>Note: This is tentative list; the teachers concern can add more program as per requirement.</p> <ol style="list-style-type: none"> 1. Preparation of LB broth and agar 2. Isolation of DNA from Plant cell. 3. Estimation of DNA by DPA method. 4. Isolation RNA from yeast cells 5. Use of Centrifugation 6. Determination of glucose concentration using Spectrophotometer/Colorimeter 7. Electrophoresis, Agarose gel and SDS PAGE 8. Isolation of primary metabolites and Secondary metabolites from Paper chromatography/TLC 9. Retrieve DNA /Protein sequence from Biological Data Bases (NCBI). 10. Use of Bioinformatics tools studied 11. Primer designing 12. Study of similar sequence alignment using BLAST and Clustal W 13. Generating phylogenetic tree using MEGA 14. Tertiary structure prediction using SWISSMODEL
Keywords: DNA/RNA Isolation, NCBI, BLAST, Electrophoresis, TLC	

Part C - Learning Resource	
Text Books, Reference Books, Other Resources .	
Suggested Readings:	
<ol style="list-style-type: none"> 1. Lehninger: Principles of Biochemistry (2013) 6th ed., /Nelson, D.L. and Cox, M.M., W H Freeman and Company (New York), ISBN:13: 978-1-4641-0962-1 / ISBN:10:1-4292- 3414-8. 2. Devlin, T.M., Textbook of Biochemistry with Clinical Correlations (2011) 7th ed., John Wiley & Sons, Inc. (New York), ISBN: 978-0-470-28173-4 / BRV ISBN: 978-0-470- 60152-5. 3. Karp, G. 2010. Cell and Molecular Biology: Concepts and Experiments. 6th Edition. John Wiley& Sons. Inc. 4. De Robertis, E.D.P. and De Robertis, E.M.F. 2006. Cell and Molecular Biology. 8th edition. Lippincott Williams and Wilkins, Philadelphia. 5. Cooper, G.M. and Hausman, R.E. 2009. The Cell: A Molecular Approach. 5th edition. ASM Press & Sunderland, Washington, D.C.; Sinauer Associates, MA. 6. Becker, W.M., Kleinsmith, L.J., Hardin. J. and Bertoni, G. P. 2009 The World of the Cell. 7th edition. Pearson Benjamin Cummings Publishing, San Francisco. 7. Donald, V. and Judith G.V., Biochemistry (2011) 4th ed., John Wiley & Sons Asia Pvt. Ltd. (New Jersey), ISBN:978-1180-25024. 8. Nicholas C.P. and Lewis S Fundamentals of Enzymology (1999) 3rd ed., Oxford University Press Inc. (New York), ISBN:0 19 850229 X. 	

Dr. K. K. P. K.

Dr. K. K. P. K.

9. Berg, J.M., Tymoczko, J.L. and Stryer L., Biochemistry (2012) 7th ed., W.H. Freeman and Company (New York), ISBN:10:1-4292-2936-5, ISBN:13:978-1-4292-2936-4
 10. Akanksha Jain, Sonia Bajaj, Sushma Solanki (2022) Text book of Biotechnology, Probcecell Press

E-learning Resources:

https://ia600105.us.archive.org/30/items/FundamentalsBiochemistry4e_201802/FundamentalsBiochemistry4e.pdf
<https://vlab.amrita.edu/?sub=3&brch=273>
<https://britannica.com>
<https://en.wikibooks.org/wiki/Biochemistry>
<https://nptel.ac.in>
<https://www.biointeractive.org/classroom-resources/bacterial-identification-virtual-lab>
<https://www.vlab.co.in/>

Part D: Assessment and Evaluation

Suggested Continuous Evaluation Methods:

Maximum Marks: 50

Continuous Comprehensive Evaluation (CCE): Not Applicable

University Exam(UE): 50 Marks

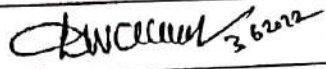
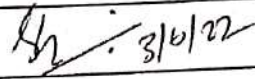

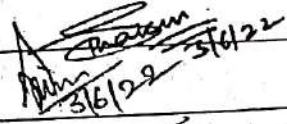
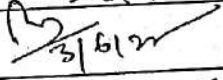
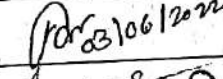
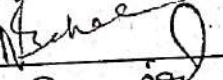
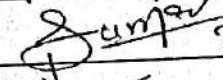
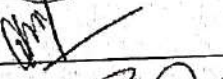
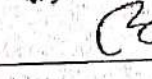
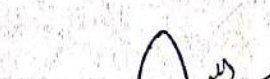
Internal Assessment: Continuous Comprehensive Evaluation (CCE)	Class Test/Assignment/Presentation	Not Applicable
External assessment University Exam (UE)	As per Govt. norms.	


Dr. Anand

Anand
 DR. K. K. PATEL
 प्राध्यापक
 श्रीहीर नंदकुमार पटेल
 विद्यालय, रायगढ़ (ज.ग.)

Declaration

Syllabus is framed as per the ToR

Name	Signature
Dr DSVGK Kaladhar, Prof & Chairperson CBoS Biotechnology, UTD ABVV	 3/6/22
Dr Pramod Kumar Mahish, Asst. Professor Govt. Digvijay College Rajnandgaon	 3/6/22
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3/6/22
Dr Ashish Kumar
विश्वविद्यालय, रायपुर (छ.ग.)

Scheme of B.Sc. Botany

Year	Course Code	Subject Name	Theory/ Practical	Total Credit	Total Marks	
					Max	Min
Second year	BOT-3T	Plant Systematics, Economic Botany and Ethnobotany	Theory	4	50	17
	BOT-4T	Plant Anatomy, Embryology and Plant Breeding	Theory	4	50	17
	BOT-2P	LAB 2 : Plant Identification and Embryology	Practical	2	50	17

Note: There shall be four extra credits in each year for internship/apprenticeship. The certificate of extra credits for this would be provided by the concern university and it is not mandatory.

Shanta
Dr A.K. Bharati 27/6/23
 अध्यक्ष मंडळ
 शहीद नंदकुमार पटेल
 विश्वविद्यालय, रायगढ़ (छ.ग.)

Part A: Introduction			
Program: Diploma in Plant Identification and plant preservation		Class: B. Sc. II Year	Year: 2023 Session: 2023-2024
1.	Course Code	BOT-3T	
2.	Course Title	Plant Systematics, Economic Botany and Ethnobotany	
3.	Course Type	Theory	
4.	Pre-requisite (if any)	NO	
5.	Course Learning Outcomes (CLO)	At the end of this course, the students will be able to <ul style="list-style-type: none"> • Understand the Plant Taxonomy • Learn the characteristics of families included • Learn economic importance of different plants of the concerned families • Understand the traditional knowledge about the plants and possible application of this knowledge 	
6.	Credit Value	Theory: 4	
7.	Total Marks	Max. Marks: 50	Min Passing Marks: 17

Part B: Content of the Course		
Total Periods: 60		
Unit	Topics	No. of Period
I	Taxonomic Resources & Nomenclature: Components of taxonomy (identification, nomenclature, classification); Taxonomic resources: Herbarium- functions & important herbaria, Botanical gardens, Flora, Keys- single access and multi-access. Principles and rules of Botanical Nomenclature according to ICBN	12
II	Types of classification & Evidences: Artificial, natural and phylogenetic. Bentham and Hooker (upto series), Engler and Prantl (upto series) and Hutchinson classification. Introduction to taxonomic evidences from palynology, cytology and phytochemistry	12
III	Families: A study of the following families (Following Bentham & Hooker's system) with economic importance: Ranunculaceae, Brassicaceae, Malvaceae, Rutaceae, Fabaceae, Myrtaceae, Cucurbitaceae, Rubiaceae, Asteraceae, Apocynaceae, Acanthaceae, Asclepiadaceae, Solanaceae, Amaranthaceae, Euphorbiaceae, Papaveraceae, Apiaceae, Lamiaceae, Orchidaceae, Liliaceae, Musaceae and Poaceae.	12
IV	Economically valuable plants: Centre of origin and domestication of crop plants; Botanical name, family, part used and uses of oil yielding plants, fibre yielding plants, Rubber, Dyes, Timber, Sugar and beverages	12
V	Ethnobotany: Concept of Ethnobotany, Documentation, Conservation and application of Traditional Knowledge, Sacred grooves, Role of AYUSH, CIMAP and NMPB Role of important medicinal plants in Traditional therapeutic practices: <i>Aegle marmelos</i> , <i>Asparagus racemosus</i> , <i>Andrographis paniculata</i> , <i>Ocimum sanctum</i> , <i>Aloe vera</i> , <i>Nyctanthes arbor-tristis</i> etc. Conservation of medicinal plants and ethnomedicinal knowledge. Plants in primary healthcare: <i>Tinospora cordifolia</i> , <i>Ocimum sanctum</i> , <i>Aloe vera</i> , <i>Azadirachta indica</i> etc.	12

For records
13.6.22

अध्यक्ष
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विश्वविद्यालय, रायगढ़ (उ.प्र.)
27/6/23

Keywords: Taxonomy, classification, Families ,ethnobotany

Part C -Learning Resources

Suggested Readings:

1. Plant Systematics. Arun K. Pandey & Shruti Kansana. 2020. Jaya Publishing House.
2. Bole, P. V. and Vaghani, Y. (1986) Field guide to the common trees of India. Oxford University Press; Bombay.
3. Brandis, D. (1906) Indian Trees (London, 5th edition. 1971). International Book Distributors; Dehra Dun.
4. Dallwitz, M. J., Paine, T. A. and Zurcher, E. J. (2003). Principles of interactive keys. <http://delta-intkey.com>
5. <https://www.naace.co.uk/school-improvement/ict-mark/>
6. Pandey, B.P. 2007. Botany for Degree Students: Diversity of Seed Plants and their Systematics, Structure, Development and Reproduction in Flowering Plants. S. Chand & Company Ltd, New Delhi.
7. Singh, G. 1999. Plant Systematics: Theory and Practice. Oxford and IBH, New Delhi.
8. Dutta A.C. 2016. Botany for Degree Students. Oxford University Press.
9. Randhawa, G.S. and Mukhopadhyay, A. 1986. Floriculture in India. Allied Publishers
10. Kochhar, S.L. (2011). Economic Botany in the Tropics, MacMillan Publishers India Ltd., New Delhi. 4th edition.
11. Sambamurthy, AVSS & Subrahmanyam, NS (2000). Economic Botany of Crop Plants. Asiatic Publishers. New Delhi.
12. Singh, D.K and K.V. Peter. 2014. Protected cultivation of horticultural crops. New India Publishing Agency, India.
13. Reddy P. Parvatha. 2016. Sustainable crop protection under protected cultivation. Springer, Singapore.
14. Amit Deogirikar. 2019. A Text Book on Protected Cultivation and Secondary Agriculture. Rajlaxmi Prakashan, Aurangabad, India.
15. Singh, B., B. Singh, N. Sabir and M Hasan. 2014. Advances in protected cultivation. New India Publishing Agency, India.
16. Sharma, OP. 1996. Hill's Economic Botany (Late Dr. AF Hill, adopted by OP Sharma). Tata McGraw Hill Co. Ltd., New Delhi.

Suggested equivalent online courses:

1. <https://www.easybiologyclass.com/topic-botany/>
2. <http://cgyankosh.ac.in/handle/123456789/53530>
3. <https://www.delta-intkey.com/www/desc.htm>
4. <https://milneorchid.weebly.com/plant-id-for-beginners.html>
5. <https://plants.usda.gov/classification.html>
6. https://www.senecaohs.org/pages/uploaded_files/Plant%20Classification.pdf
7. https://www.ladykeanecollege.edu.in/files/userfiles/file/Dr_%20S_%20Nongbri%20III%20Sem%20ppt.pdf
8. https://www.brainkart.com/article/Bentham-and-Hooker-s-classification-of-plants---Dicotyledonae,-Gymnospermae-and-Monocotyledonae_1000/
9. <https://libguides.rutgers.edu/c.php?g=336690&p=2267037>
<https://www.delta-intkey.com/>

Part D: Assessment and Evaluation

Suggested Continuous Evaluation Methods:

Maximum Marks: 50

Continuous Comprehensive Evaluation (CCE): As per rule

University Exam(UE): 50Marks

Arundh
13.6.22

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आभयान मंडल
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विश्वविद्यालय, रायगढ़ (छ.ग.)
27/6/23

Declaration

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Asst. Prof.
Gramya Bharti Vidyapith, Hardibazar | - | Chairman | <i>Prabhat</i> |
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Govt. E.R.R. P.G. Science College, Bilaspur | - | Member | <i>A.N. Bahadur</i> |
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Kirodimal Govt. Arts & Science College, Raigarh | - | Member | <i>Ashok</i> |
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Govt. J.Y. Chhattisgarh College, Raipur | - | Member | <i>Smriti</i>
13/06/2022 |
| 7. Dr. Rupinder Diwan
Professor
Govt. Nagarjun P.G. College of Science, Raipur | - | Member | <i>Rupinder</i>
13/6/22 |
| 8. Dr. Usha Chandel
Asst. Prof.
Govt. Dr. W.W. Patankar Girls P.G. College, Durg | - | Member | <i>Usha</i> |
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Asst. Prof.
Govt. Pt. Shyamacharan Shukla College, Dharsiwa,
Raipur | - | Member | <i>Kaushal</i> |
| 10. Mr. Anand Kumar | - | Member | |

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अध्यक्ष
आध्ययन मंडल
शहीद नंदकुमार विश्व
विश्वविद्यालय, रायगढ़ (छ.ग.)
Prabhat
27/6/23

Part A: Introduction			
Program: Diploma in Plant Identification and plant preservation		Class: B.Sc. II Year	Year: 2023
		Session: 2023-2024	
1.	Course Code	BOT-4 T	
2.	Course Title	Plant Anatomy, Embryology and Plant Breeding	
3.	Course Type	Theory	
4.	Pre-requisite (if any)	NO	
5.	Course Learning Outcomes (CLO)	At the end of this course, the students will be able to 1. Understand the internal structure of root, stem and leaves 2. learn about the anomalous secondary growth of some plants 3. understand the life cycle of angiospermic plants with details of microsporogenesis, megasporogenesis, fertilization and other developmental details up to embryogenesis 4. understand concept of plant breeding and its application	
6.	Credit Value	Theory: 4	
7.	Total Marks	Max. Marks: 50	Min Passing Marks: 17

Part B: Content of the Course		
Total Period: 60		
Unit	Topics	No. of Period
I	Meristems and related theories: Meristematic and permanent tissues, Root meristem, Stem meristem and Leaf meristem. Theories of apical organization: Apical Cell Theory, Histogen Theory and Tunica Carpus Theory	12
II	Anatomy and Secondary growth: Anatomy of Root, Stem and Leaves of both Dicots and Monocots. Secondary growth in Dicots, Anomalous secondary growth in <i>Bignonia</i> , <i>Boerhaavia</i> , <i>Dracaena</i> and <i>Nyctanthes</i>	12
III	Plant Embryology: Flower: Structure and types (Complete, Incomplete, Perfect and Imperfect flower), Microsporangium and Microsporogenesis, Ovule: Structure and types, Megasporogenesis, Development of female gametophyte (Embryo sac), Types of Embryo sac, Pollination, Pollen-pistil interaction, Fertilization, Double fertilization, Endosperm and its types, Embryogenesis, Apomixis and Polyembryony	12
IV	Plant Breeding: Plant Introduction, Agencies of plant introduction in India, Procedure of introduction- Acclimatization- Achievements, Selection- mass selection, pure line selection and clonal selection. Genetic basis of selection methods	12
V	Hybridization: Procedure of hybridization, inter-generic, inter-specific and inter-varietal hybridization. Composite and synthetic varieties, Heterosis, Mutation and Molecular breeding (use of DNA markers in plant breeding). Role of hybridization in agriculture, horticulture and forestry	12

Keywords: Meristems, Anomalous secondary growth. Pure line selection. Hybridization.

सध्यक

अध्ययन मंडल
 श्रीदी नंदकुमार सिंह
 विश्वविद्यालय, रायचूर, बिहार
 27/6/23

for records
 13.6.22

Part C -Learning Resources

Text Books, Reference Books, Other Resources

1. M K Raxdan An Introduction to Plant Tissue Culture -; Oxfird& IBH Publishing Co.Pvt. Ltd.,New Delhi
2. Allard RW (1960) Principles of Plant Breeding. John Willey and Sons, Inc. New York
3. BD Singh (2003) Plant Breeding. Kalyani Publishers
4. Sharma JR (1994) Principles and Practices of Plant Breeding. Tata McGraw-Hill Pub. Co. New Delhi
5. Pandey BP (2010) College Botany Vol II, S. Chand and Company, New Delhi.
6. Maheshwari P (1971). An Introduction to Embryology of Angiosperms, McGraw Hill Book Co., London
7. Bhojwani SS and Bhatnagar SP (2000). The Embryology of Angiosperms (4th Ed.), Vikas Publishing House
8. Evert RF (2006). Esau's Plant Anatomy: Meristems, Cells and Tissues of the Plant body: Their Structure, Function and Development, John Willey and Sons, Inc
9. Pandey BP .Plant Anatomy, S. Chand Publishers, New Delhi
10. Srivastava HN (2006). Plant Anatomy, Pradeep Publications, Jalandhar

Suggested equivalent online resources:

1. https://www.pnas.org/content/104/suppl_1/8641
2. <https://www.journals.uchicago.edu/doi/pdfplus/10.1086/659998>
3. <https://bsi.gov.in/page/en/ethnobotany>
4. <http://www.legalserviceindia.com/article/198-Intellectual-Property-and-Traditional-knowledge.html>
5. https://www.brainkart.com/article/Economic-importance-Plants---Food,-Rice,-Oil,-Fibre,-Timber-yielding-plant_1095/
6. <https://www.loc.gov/rr/scitech/tracer-bullets/economic-botanytb.html>
7. <http://nsdl.niscair.res.in/bitstream/123456789/127/1/Fibre%20crops%2C%20bamboo%2C%20timber%20-%20Final.pdf>
8. <https://www2.palomar.edu/users/warmstrong/econpls.htm>
9. <https://www.longdom.org/proceedings/phytochemistry-and-phytoconstituents-of-herbal-drugs-and-formulations-1668.html>

Part D: Assessment and Evaluation**Suggested Continuous Evaluation Methods:**

Maximum Marks: 50

Continuous Comprehensive Evaluation (CCE):As per rule

University Exam(UE): 50Marks

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 13.6.22

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 विश्वविद्यालय, रायगढ़ (उ.ग.)
 27/6/22

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विश्वविद्यालय, रायपुर (छ.ग.)

Prabhat
27/6/23

Part A : Introduction			
Programme: Certificate		Class B.Sc.-II	Year: 2022 Session: 2022-23
1.	Course Code	BOT-2P	
2.	Course Title	Plant Identification and Embryology	
3.	Course Type	Practical	
4.	Pre-requisite (if any)	No	
5.	Course outcomes:	Course outcomes: After the completion of the course the students will be able: <ul style="list-style-type: none"> To learn how plant specimens are collected, documented, and curated for a permanent record. To observe, record, and employ plant morphological variation and the accompanying descriptive terminology. To gain experience with the various tools and means available to identify plants. To develop observational skills and field experience. To identify a taxonomically diverse array of native plants. To recognize common and major plant families. Comprehend the concepts of plant taxonomy and classification of Angiosperms. 	
6.	Credit Value	2	
7.	Total Marks	Max. Marks: 50	Min. Passing Marks: 17
Part B : Content of the Course			
Total No. of Periods - 30			
Tentative Practical List	Topic*	*(Topic * (Minimum Any three from each unit depending on facilities and syllabus. 20% for spotting, 10% each for viva and sessional and rest 60 % marks equally in each unit.)	
		Herbarium: Plant collection, Preservation and Documentation: Stepwise Practicing Herbarium techniques: <ol style="list-style-type: none"> FIELD EQUIPMENTS, Collection of any wild 25 plant specimens Learn to handle Herbarium making tools Pressing and Drying of collected plant specimens Special treatments for all varied groups of plants Mount on standard herbarium sheets Label them using Standard methods 	
		Arrange the prepared herbarium according to Bentham and Hookers system of classification- <ol style="list-style-type: none"> herb, shrub and trees annual, biannual and perennial cereals, pulses, vegetables and medicinal ethnobotanical importance 	

For Records
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अध्यक्ष
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<p>Taxonomic Identification of angiospermic plants: Description of plants belonging to following families in semitechnical language and identification up to family level: Brassicaceae, Malvaceae, Fabaceae, Cucurbitaceae, Asteraceae, Apocyanaceae, Asclepiadaceae, Solanaceae, Euphorbiaceae, Papaveraceae, Apiaceae Acanthaceae, Labiatae (Lamiaceae), Rubiaceae. Liliaceae, Musaceae, Poaceae.</p> <p>Identification during field visits: Field identification of common wild plants from families included in the theory syllabus.</p>
<p>a) Documentation of Ethnobotanical wisdom of area b) Study of economically valuable plants: Medicinal plants, oil yielding plants, cereals, sugarcane, beverages etc.</p>
<p>1. Anatomy of: Dicot root, stem and leaf 2. Monocot root, stem and leaf 3. Plants showing primary anomaly and anomalous secondary growth a) Study of an angiospermic flower b) Dissection of Ladys finger /Tridax/citrus seeds for study of embryo</p>

Part C - Learning Resource	
Text Books, Reference Books, Other Resources	
Suggested Readings:	<ol style="list-style-type: none"> 1. Bole, P. V. and Vaghani, Y. (1986) Field guide to the common trees of India. Oxford University Press; Bombay. 2. Womersley, J. S. 1981. Plant collecting and herbarium development: A manual.S.K. Pandey (2012). Quick Concept of Botany. Publisher LAP LAMBERT Academic Publishing GmbH & Co. KG, Germany (ISBN: 978-3-8484-3104-5). 3. Pandey S.K. (2012). Quick Concept of Botany. Publisher LAP LAMBERT Academic Publishing GmbH & Co. KG, Germany (ISBN: 978-3-8484-3104-5). 4. Manilal, K. S. and M. S. Muktesh Kumar (ed.) (1998) A Hand book of Taxonomy Training, DST,N. Delhi 5. Dhopte, A.M. (2003) Principles and Techniques for Plant Scientists. - Agrobios,Jodhpur, India. 6. Jain, S.K. & R.R. Rao. 1977. A handbook of field and herbarium methods. Today & Tomorrow's Printers and Publishers, New Delhi.
E-learning Resources:	<ol style="list-style-type: none"> 1. http://egyankosh.ac.in/bitstream/123456789/13096/1/Unit-5.pdf 2. https://www.for.gov.bc.ca/hfd/pubs/docs/wp/wp18.pdf 3. https://www.researchgate.net/publication/267510854 The Flowering Plants Handbook

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Part D – Assessment and Evaluation

Suggested Continuous Evaluation Methods:

Maximum Marks: 50

Continuous Comprehensive Evaluation (CCE): Not Applicable

University Exam(UE): 50 Marks

Internal Assessment: Continuous Comprehensive Evaluation (CCE)	Class Test/Assignment/Presentation	Not Applicable
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for records
13.6.22

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अध्यक्ष 27/6/23
अध्ययन मंडल
शहीद नंदकुमार पटेल
विश्वविद्यालय, रायगढ़ (उ.प्र.)

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Prabhat Pandey
13.6.22


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शहीद नंदकुमार पटेल
विश्वविद्यालय, रायगढ़ (छ.ग.)

Scheme of B.Sc. Computer Science

Year	Course Code	Subject Name	Theory/ Practical	Total Credit	Total Marks	
					Max	Min
Second	COMP-3T	Data Structure	Theory	4	50	17
	COMP-4T	Web technology and Java	Theory	4	50	17
	COMP-2P	LAB 2: Web technology and Java	Practical	2	50	17


Note: There shall be four extra credits in all the years of under graduation for internship/apprenticeship. The certificate of extra credits would be provided by the concern university and is not mandatory.





 अध्यक्ष C.S.S.
 शाहीद संदकुमार पटेल
 विश्वविद्यालय, रावाढ (उ.प्र.)

Part A: Introduction			
Program: Diploma Course		Class: B.Sc.-CS II Year	Year: 2022 Session:2022-2023
1.	Course Code	COMP-3T	
2.	Course Title	Data Structure	
3.	Course Type	Theory	
4.	Pre-requisite (if any)	No	
5.	Course Learning Outcomes (CLO)	<p>At the end of this course, the students will be able to:</p> <ul style="list-style-type: none"> • Use different types of data structures, operations and algorithms. • Implement appropriate sorting/searching technique for any given problem. • Use stack, Queue, Lists, Trees and Graphs in problem solving. • Find suitable data structure during application development/ Problem Solving. 	
6.	Credit Value	Theory: 4	
7.	Total Marks	Max Marks: 50	Min Passing Marks: 17

Part B: Content of the Course		
Total Periods: 60		
Unit	Topics	No. of Periods
I	<p>Introduction and Basic Concepts of Data Structure: Data types: primitive, non-primitive data types, ADT, Linear and nonlinear data structure.</p> <p>Linear Data Structures: Arrays: One dimensional, Multidimensional array, allocation methods, address calculations, sparse arrays. Linked List: Singly and Doubly Linear link lists, singly and doubly circular linked list: Definitions, operations (INSERT, DELETE, TRAVERSE) on these lists. (Insertion operation includes – insertion before a given element, insertion after a given element, insertion at given position, insertion in sorted linked list)</p>	12
II	<p>Stack: Stack: Definition, Operations PUSH, POP, TRAVERSE, implementations using array and linked list, Applications of stack: Infix, Prefix, Postfix representation and conversion using stack, Postfix expression evaluation using stack.</p> <p>Queue: Introduction, and Types of Queues: Priority Queue, Circular queue, Double Ended Queue, operations (INSERT, DELETE, TRAVERSE), implementation using array and linked list and applications</p>	12
III	<p>Non-linear Data Structure: Trees: Definition of trees and their types, Binary trees, Properties of Binary trees and Implementation operation (Insertion, deletion, searching and traversal algorithm: preorder, post order, in-order traversal), Binary Search Trees, Implementations, Threaded trees, AVL Trees.</p>	12
IV	<p>Graph: Definition of Graph and their types, adjacency and incident (matrix & linked list) representation of graphs, Graph Traversal – Breadth first Traversal, Depth first Traversal, Connectivity of graphs; Weighted Graphs, Shortest path Algorithm, spanning tree, Minimum Spanning tree, Kruskal's and prim's algorithms. Static Hashing: Introduction, Hash table, Hash function.</p>	12



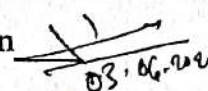
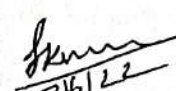

 सत्यजित मंडल
 सहायक निदेशक/प्रमुख
 विश्वविद्यालय, रायगढ़ (उ.प्र.)


V.	Sorting Methods: Types of sorting, Sequential Sort, Insertion Sort, Bubble Sort, Quick Sort, Merge Sort. Searching: Linear search, Binary search, Hashing, collision resolution methods, Comparison of Search trees.	12
Keywords: Linear Data Structure, Non-linear Data Structure, Searching, Sorting, Graph.		

Part C - Learning Resources	
Text Books, Reference Books, Other Resources	
Suggested Readings:	
<ol style="list-style-type: none"> 1. "Data Structures and Algorithms in C++", Michael T. Goodrich, Wiley, 2007 2. "Fundamentals of Data Structures", Horowitz and Sahani, Computer Science Press, 1978 3. "Data structures and Algorithms", Aefred V. Aho, Jhon E. Joperoft and J.E. Ullman. 4. "An Introduction to Data Structures with Applications", Jean Paul Trembley and Paul Sorenson, TMH, International Student Edition, 1985 5. "Data Structures and Program Design in C", R. Kurse, Leung & Tondo, 2nd Edition, PHI publication 	
E- Resources:	
<ol style="list-style-type: none"> 1. Introduction to Data Structure https://www.youtube.com/watch?v=zWg7U00EAOE&list=PLBF3763AF2E1C572F&index=1 2. Stacks https://www.youtube.com/watch?v=g1USSZVWDsY&list=PLBF3763AF2E1C572F&index=2 3. Queues and linked list https://www.youtube.com/watch?v=PGWZUgzDMYI&list=PLBF3763AF2E1C572F&index=3 4. Trees https://www.youtube.com/watch?v=tORLeHHtazM&list=PLBF3763AF2E1C572F&index=6 5. Graphs https://www.youtube.com/watch?v=9zpSs845wf8&list=PLBF3763AF2E1C572F&index=24 	
Part D: Assessment and Evaluation	
Maximum Marks: 50	

Declaration

The syllabus of this subject is framed as per the TOR provided by the department of higher education, Chhattisgarh.

- | | | |
|---|---|--|
| 1. Dr. H.S. Hota
Prof. and Head, Dept. of Computer Science and Application
Atal Bihari Vajpayee Vishwavidyalaya, Bilaspur | - | Chairman  |
| 2. Dr. Sanjay Kumar
Prof. and Head, SoS in Computer Science,
Pt. Ravishankar Shukla University, Raipur | - | Member |
| 3. Mr. Jitendra Kumar
Asst. Prof., Dept. of Computer Science and Application
Atal Bihari Vajpayee Vishwavidyalaya, Bilaspur | - | Member  |
| 4. Mr. H.S.P. Tonde | - | Member |

 अध्यक्ष
श्री श्री मंदकेश्वर प्रसाद
सहायक, चhattisgarh (उ.प्र.)

- Asst. Prof. and Head, Dept. of Computer Science,
Sant Gahira Guru University Sarguja, Ambikapur
5. Dr. Mamta Singh - Member *Mamta*
Asst. Prof. and Head, Sai College, Bhilai
Hemchand Yadav Vishwavidyalaya, Durg *31/6/22*
6. Mr. Sushil Kumar Sahu - Member *Sushil*
Asst. Prof. and Head, Christ College, Jagdalpur
Shaheed Mahendra Karma Vishwavidyalaya, Bastar *31/6/2022*
7. Mr. Vikrant Gupta - Member *Vikrant*
Prof. and Head, Batmul Ashram College, Salheana
Shaheed Nand Kumar Patel University, Raigarh
8. Mr. L.K. Gavel - Member *L.K. Gavel*
Asst. Prof. and Head, Govt. Ghanshyam Singh Gupt, PG College, Balod
Hemchand Yadav Vishwavidyalaya, Durg *03/06/22*
9. Dr. Anil Kumar Sharma - Member *Anil*
Asst. Prof. and Head, A.P.S.G.M.N.S, Govt. PG College, Kawardha
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10. Mr. Vishwnath Tamrakar - Member
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Pt. Ravishankar Shukla University, Raipur
11. Ms. Anjeeta Kujur - Member *Anjeeta*
Asst. Prof. and Head, Govt. R.B.R.N.E.S. PG College, Jashpur
Sant Gahira Guru University Sarguja, Ambikapur *03/06/22*
12. Mr. Suresh Kumar Thakur - Member *Suresh*
Asst. Prof. and Head, Indira Gandhi Govt. PG College, Vaishali Nagar
Hemchand Yadav Vishwavidyalaya, Durg *03/06/22*
13. Dr. Ugrasen Suman - Member
Prof. and Head, Dept. of Computer Science
Devi Ahila Vishwavidyalaya, Indore (Present Online)

Date: 03.06.2022

अश्विनी
अध्यक्ष मंडल
शाहीद नंदकुमार पटेल
विश्वविद्यालय, रायगढ़ (छ.ग.)

Part A: Introduction			
Program: Diploma Course		Class: B.Sc.-CS II Year	Year: 2022
		Session:2022-2023	
1.	Course Code	COMP-4T	
2.	Course Title	Web Technology and Java	
3.	Course Type	Theory	
4.	Pre-requisite (if any)	Basic understanding of programming concepts and programming language	
5.	Course Learning Outcomes (CLO)	<p>At the end of this course, the students will be able to:</p> <ul style="list-style-type: none"> • Create applications using HTML, CSS and Java Script. • Understand fundamental tools and technologies for web design. • Specify design rules in constructing web pages and sites. • Understand how web pages are designed and created. • Design console-based GUI based and web based application. • Front end designing using html, CSS, java script and bootstrap. • Develop server-side programs in the form of Servlet. • Designing web application by using JSP as a server-side programming. • Design and implement dynamic websites with good aesthetic sense of designing and latest technical know-how's Create web pages using HTML and Cascading Styles sheets. • Analyze a web page and identify its elements and attributes Create dynamic web pages using JavaScript. • Build web applications using JSP and Servlet. 	
6.	Credit Value	Theory: 4	
7.	Total Marks	Max. Marks: 50	Min Passing Marks : 17

Part B: Content of the Course		
Total Periods: 60		
Unit	Topics	No. of Periods
I	<p>Introduction: Overview of WWW, Web page, Web browsers, HTTP, URL, Hypertext, Web server, Tools for web site development, hosting options and domain name registration.</p> <p>Markup language: Introduction, DTD, Creating Web pages, Headings, Paragraphs, Lists, Hyperlinks, Tables, Web forms, Input Types, Input Attributes, Inserting images, Frames, Basics of DHTML, XML , XHTML.</p>	12

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I	<p>Web Development: CSS- Introduction, Syntax, measurement units, colors, Backgrounds, Font, Text, position, Align, Images, Link, Table, List, Padding.</p> <p>JavaScript: Overview, syntax, Variables, Operators, Decision control statement, Looping statement, JavaScript functions, Java script Events, Cookies, Page Redirect, and Validation.</p> <p>Bootstrap: Introduction, Grid system, typography, tables, images, dropdowns, jumbotron, them, template and forms.</p> <p>PHP: Introduction, syntax, variables, operators, functions, include, get method, post method, cookies, session, PHP form validation, exception.</p>	12
II	<p>JAVA: Primitive Data Types, Variables, Array, operators, control statements, classes and objects, Abstract Classes, Polymorphism, Inheritance, Method Overwriting, method overriding, constructor, super keyword, this keyword, final static, package and interface, Multi-threading and Exception Handling, Collection Framework. Introduction to applet.</p>	12
III	<p>Java Server Page (JSP): Basics of Servlet, writing simple program in Servlet, Introduction to Java Server Page (JSP), Embedding Java Code into HTML, Implicit JSP Objects, Overview of the JSP Tags, Directives, Declarations, Expressions, Deploying Servlet and JSP, JSTL, JSP Action elements: jsp:forward, jsp:include, JSP Request, JSP Response, JSP Config, JSP Session, Cookies, JSP Exception Handling.</p>	12
IV	<p>Database Using JDBC: Concept, JDBC Driver Types, JDBC package, establishing a database connection and executing SQL Statements.</p>	12
<p>Keywords: Web Designing, Collection Framework, Servlet, JSP, Database Connectivity.</p>		

Part C: Learning Resources


Text Books, Reference Books, Other Resources

Suggested Readings:

1. The Complete Reference JAVA, Herbert Schildt, Tata McGraw Hill publication, 5th Edition.
2. Advance JAVA, Gejendra Gupta, Firewall Media, 1st Edition, 2006.
3. JAVA network programming, Elliotte Rusty Harold, O'Reilly Publication, 3rd Edition.
4. Core Java for Beginners, Rashmi Kanta Das, Vikas Publishing House Pvt. Ltd.
5. Internet and Internet Engineering, Daniel Minoli, TMH (Latest Edition)
6. Java Script, Gosslin, Vikas (Latest Edition)
7. HTML The Definite Guide, Chuck musiano & Bill Kenndy, O Reilly (Latest Edition).

E Resources:




 अध्यक्ष
 राज्य मंडल
 राज्य मंडल मंदकुमार पटेल
 विश्वविद्यालय, रायगड (उ.प्र.)

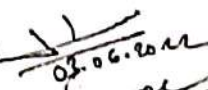
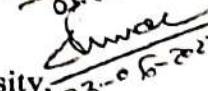



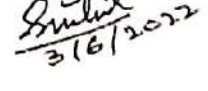
1. Introduction to web-app
https://www.youtube.com/watch?v=I7np3HRRFzw&list=PLJ5C_6qdAvBEJ6-TBzKoa1Ov21hwDzJfM&index=22
2. Building web-app
https://www.youtube.com/watch?v=kEen4LqAQIE&list=PLJ5C_6qdAvBEJ6-TBzKoa1Ov21hwDzJfM&index=3
3. Introduction to Java Script
https://www.youtube.com/watch?v=rRbP92oSep0&list=PLJ5C_6qdAvBEJ6-TBzKoa1Ov21hwDzJfM&index=10
4. Introduction to Database
https://www.youtube.com/watch?v=mte0IIIrUKpl&list=PLJ5C_6qdAvBEJ6-TBzKoa1Ov21hwDzJfM&index=12
5. Introduction to SQL
https://www.youtube.com/watch?v=ar2naKy0aPw&list=PLJ5C_6qdAvBEJ6-TBzKoa1Ov21hwDzJfM&index=16
6. Introduction to Java
https://www.youtube.com/watch?v=Ojdt2l-EZJA&list=PLfh3eNtmZdPOe3R_wO_h540QNIMkCQ0ho&index=1


Part D: Assessment and Evaluation


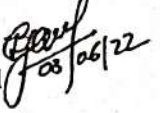
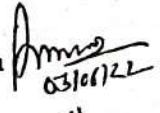
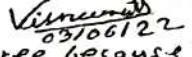
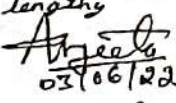
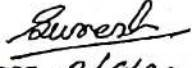
Maximum Marks: 50

Declaration


The syllabus of this subject is frame as per the TOR of department of higher education, Chhattisgarh.

- | | | | |
|---|---|----------|---|
| 1. Dr. H.S. Hota
Prof. and Head, Dept. of Computer Science and Application | - | Chairman | 
02.06.2022 |
| 2. Dr. Sanjay Kumar
Prof. and Head, SoS in Computer Science, Pt. Ravishankar Shukla University,
Raipur | - | Member | 
03-06-2022 |
| 3. Mr. Jitendra Kumar
Asst. Prof., Dept. of Computer Science and Application
Atal Bihari Vajpayee Vishwavidyalaya, Bilaspur | - | Member | 
3/6/22 |
| 4. Mr. H.S.P. Tonde
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3/6/22 |
| 5. Dr. Mamta Singh
Asst. Prof. and Head, Sai College, Bhilai
Hemchand Yadav Vishwavidyalaya, Durg | - | Member | 
3/6/22 |
| 6. Mr. Sushil Kumar Sahu
Asst. Prof. and Head, Christ College, Jagdalpur | - | Member | 
3/6/2022 |


उपस्थित
राज्यमंडल
शहीद नंदकुमार पटेल
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- Shaheed Mahendra Karma Vishwavidyalaya, Bastar
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Shaheed Nand Kumar Patel University, Raigarh
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10. Mr. Vishwnath Tamrakar - Member 
- Asst. Prof. and Head, Sant Guru Ghasidas Govt. PG College, Kurud,
Pt. Ravishankar Shukla University, Raipur *Not agree because
syllabus is lengthy*
11. Ms. Anjeeta Kujur - Member 
- Asst. Prof. and Head, Govt. R.B.R.N.E.S. PG College, Jashpur
Sant Gahira Guru University Sarguja, Ambikapur
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Devi Ahila Vishwavidyalaya, Indore (Present Online)

Date: 03.06.2022


अध्यक्ष
अध्ययन मंडल
शहीद नंदकुमार पटेल
विश्वविद्यालय, रायगढ़ (छ.ग.)

		Part A: Introduction		
Program: Diploma Course		Class: B.Sc.-CS II Year	Year: 2022	Session: 2022-2023
1	Course Code	COMP-2P		
2	Course Title	LAB 2: Web Technology and JAVA		
3	Course Type	Practical		
4	Pre-requisite (if any)	Theoretical knowledge of HTML, CSS, JavaScript and JAVA		
5	Course Learning Outcomes (CLO)	<p>At the end of course, Students will be able to:</p> <ul style="list-style-type: none"> • Develop web-based application. • Develop front end application using front end technologies. • Demonstrate the principles of object-oriented programming. • Create multi-threaded programs and event handling mechanisms • Develop simple GUI interfaces for a computer program to interact with users. • Use form validation on web page. • Develop server-based application using Servlet and JSP. 		
6	Credit Value	Practical: 2		
7	Total Marks	Max. Marks: 50	Min Passing Marks : 17	

Part B: Content of the Course	
Total Lecturer: 30	
Tentative Practical List	<p>Note: This is tentative list; the teachers concern can add more program as per requirement.</p> <p>Developing Web based application based on the concept of Web design technologies and Java programming:</p> <ol style="list-style-type: none"> 1. Design a Login Page by using HTML and CSS. 2. Write a program to perform validation on web page. 3. Design a web page to demonstrate registration form of student. 4. Design a form by using HTML and CSS who will take input from the user through Java-script Function and check whether it is integer or not. 5. Design a device friendly web page which should be able to resize the display depending on the device by using bootstrap. 6. Write a java program to create an abstract class named shape that contains two integers and an empty method named print Area () Provide three classes named Rectangle, Triangle and Circle such that each one of the classes extends the class shape. Each one of the class contains only the method print Area () that print the area of the given shape. 7. Write a Java program that implements a multithreaded program that has three threads. First thread generates a random integer every 1 second and if the value

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 अजयान नंदल
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- is odd the third thread will print the value of the cube of the number.
8. Write a Java program which creates a list containing ice cream flavours. On selection of any flavour price should be displayed in a text field.
 9. Write a JDBC program to create a table product (id number, name varchar, Price varchar). And insert a record in the table.
 10. Write a program to execute a select query using JDBC.
 11. Write a program to execute an Update query using JDBC.
 12. Write a server program to return the square root of a number to the client using Socket.
 13. Write a server program to return Date and time to clients using socket programming.
 14. Write a JSP program for basic arithmetic functions.
 15. Write an advanced Java program to implement registration of student by using JSP.
 16. Write a program to design a web page for login form and connect to the database while using JSP and JDBC.
 17. Write a program to design a simple calculator using
 - (a) JavaScript (b) Servlet and (c) JSP.
 18. A web application that lists all cookies stored in the browser on clicking "List Cookies" button. Add cookies if necessary.
 19. Write a Java program that connects to a database using JDBC and does add, deletes, modify and retrieve operations.
 20. Develop an applet that displays a simple message.

Part C: Learning Resources

Text Books, Reference Books, Other Resources

Suggested Readings:

1. The Complete Reference JAVA, Herbert Schildt, Tata McGraw Hill publication, 5th Edition.
2. Advance JAVA, Gajendra Gupta, Firewall Media, 1st Edition, 2006.
3. JAVA network programming, Elliotte Rusty Harold, O'Reilly Publication, 3rd Edition.
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E Resources:

1. Introduction to web-app
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- Building web-app
TBzKoa1Ov21lwDzJfM&index=22
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- Introduction to Java Script
https://www.youtube.com/watch?v=nrhP92o8ep0&list=PLJ5C_6qdAvBEJ6-TBzKoa1Ov21lwDzJfM&index=10
- Introduction to Database
https://www.youtube.com/watch?v=mtc0UJlrUKpI&list=PLJ5C_6qdAvBEJ6-TBzKoa1Ov21lwDzJfM&index=12
- Introduction to SQL
https://www.youtube.com/watch?v=nr2naKy0aPw&list=PLJ5C_6qdAvBEJ6-TBzKoa1Ov21lwDzJfM&index=16
- Introduction to Java
https://www.youtube.com/watch?v=OjdT2l-EZJA&list=PLfn3cNtmZdPOc3R_wO_h540QNfMkCQ0ho&index=1

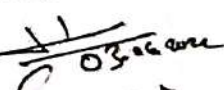
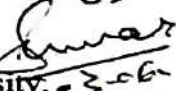
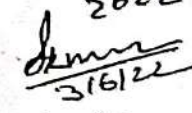
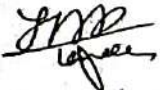

Part D: Assessment and Evaluation


Suggested Continuous Evaluation Methods:
 Maximum Marks: 50
 Continuous Comprehensive Evaluation (CCE): Not Applicable
 University Exam(UE): 50 Marks

Internal Assessment: Continuous Comprehensive Evaluation (CCE)	Class Test/Assignment/Presentation	Not Applicable
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Declaration

The syllabus of this subject is frame as per the TOR of department of higher education, Chhattisgarh.

- | | | |
|---|---|--|
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Asst. Prof. and Head, Dept. of Computer Science,
Sant Gahira Guru University Sarguja, Ambikapur | - | Member  |
| 5. Dr. Mamta Singh | - | Member  |


 31/6/22
 (U.P.)

- Asst. Prof. and Head, Sai College, Bhillai
Hemchand Yadav Vishwavidyalaya, Durg
6. Mr. Sushil Kumar Sahu - Member *Sushil*
Asst. Prof. and Head, Christ College, Jagdalpur 31/6/2022
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Prof. and Head, Batmul Ashram College, Salheana 03/06/22
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Asst. Prof. and Head, Sant Guru Ghasidas Govt. PG College, Kurud, *Not agree because syllabus is wrong* 03/06/22
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Date: 03-06-2022

[Signature]
सचिव
संयोजक मंडल
श्री श्री गुरुकुमार पटेल
विश्वविद्यालय, रायगढ़ (छ.प्र.)

Program: Diploma Course		Part A: Introduction	
Class: B.Sc.-CS II Year		Year: 2022	Session: 2022-2023
1	Course Code	COMP-2P	
2	Course Title	LAB 2: Web Technology and JAVA	
3	Course Type	Practical	
4	Pre-requisite (if any)	Theoretical knowledge of HTML, CSS, JavaScript and JAVA	
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6	Credit Value	Practical: 2	
7	Total Marks	Max. Marks: 50	Min Passing Marks : 17

Part B: Content of the Course	
Total Lecturer: 30	
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- is odd the third thread will print the value of the cube of the number.
8. Write a Java program which creates a list containing ice cream flavours. On selection of any flavour price should be displayed in a text field.
 9. Write a JDBC program to create a table product (Id number, name varchar, Price varchar). And insert a record in the table.
 10. Write a program to execute a select query using JDBC.
 11. Write a program to execute an Update query using JDBC.
 12. Write a server program to return the square root of a number to the client using Socket.
 13. Write a server program to return Date and time to clients using socket programming.
 14. Write a JSP program for basic arithmetic functions.
 15. Write an advance java program to implement registration of student by using JSP.
 16. Write a program to design a web page for login form and connect to the database while using JSP and JDBC.
 17. Write a program to design a simple calculator using
 - (a) JavaScript (b) Servlet and (c) JSP.
 18. A web application that lists all cookies stored in the browser on clicking "List Cookies" button. Add cookies if necessary.
 19. Write a java program that connects to a database using JDBC and does add, deletes, modify and retrieve operations.
 20. Develop an applet that displays a simple message.

Part C: Learning Resources

Text Books, Reference Books, Other Resources

Suggested Readings:

1. The Complete Reference JAVA, Herbert Schildt, Tata McGraw Hill publication, 5th Edition.
2. Advance JAVA, Gajendra Gupta, Firewall Media, 1st Edition, 2006.
3. JAVA network programming, Elliotte Rusty Harold, O'Reilly Publication, 3rd Edition.
4. Core Java for Beginners, Rashmi Kanta Das, Vikas Publishing House Pvt. Ltd.
5. Internet and Internet Engineering, Daniel Minoli, TMH (Latest Edition)
6. Java Script, Gosslin, Vikas (Latest Edition)
7. HTML The Definite Guide, Chuck musiano & Bill Kenndy, O'Reilly (Latest Edition).

E Resources:

1. Introduction to web-app
https://www.youtube.com/watch?v=Izn3tRRTzw&list=PLJ5C_6qdAvBEJ6-TBzKoaIOv21lwDzJfM&index=22

अध्यक्ष
 डॉ. राजेश नंदकुमार पटेल
 विश्वविद्यालय, रायगढ़ (छ.ग.)

- Building web-app
TBzKon1Ov21lwDzJIM&index=22
https://www.youtube.com/watch?v=kIEr4LqAQIE&list=PLJ5C_6qdAvBEJ6-TBzKon1Ov21lwDzJIM&index=3
- Introduction to Java Script
https://www.youtube.com/watch?v=rRbP92oSep0&list=PLJ5C_6qdAvBEJ6-TBzKon1Ov21lwDzJIM&index=10
- Introduction to Database
https://www.youtube.com/watch?v=nte0UJrUKpI&list=PLJ5C_6qdAvBEJ6-TBzKon1Ov21lwDzJIM&index=12
- Introduction to SQL
https://www.youtube.com/watch?v=ur2naKy0aPw&list=PLJ5C_6qdAvBEJ6-TBzKon1Ov21lwDzJIM&index=16
- Introduction to Java
https://www.youtube.com/watch?v=OjdT2l-EZJA&list=PLfn3eNtmZdPOe3R_wO_h540QNfMkCQ0ho&index=1

Part D: Assessment and Evaluation

Suggested Continuous Evaluation Methods:

Maximum Marks: 50

Continuous Comprehensive Evaluation (CCE): Not Applicable

University Exam(UE): 50 Marks

Internal Assessment:

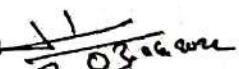

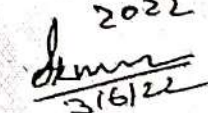
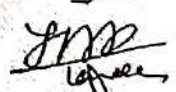

Continuous Comprehensive Evaluation (CCE)

Class Test/Assignment/Presentation

Not Applicable

Declaration

The syllabus of this subject is frame as per the TOR of department of higher education, Chhattisgarh.

1. Dr. H.S. Hota
Prof. and Head, Dept. of Computer Science and Application
Chairman  03/06/2022
2. Dr. Sanjay Kumar
Prof. and Head, SoS in Computer Science, Pt. Ravishankar Shukla University, Raipur
Member  03/06/2022
3. Mr. Jitendra Kumar
Asst. Prof., Dept. of Computer Science and Application
Atal Bihari Vajpayee Vishwavidyalaya, Bilaspur
Member  3/6/22
4. Mr. H.S.P. Tonde
Asst. Prof. and Head, Dept. of Computer Science,
Sant Gahira Guru University Sarguja, Ambikapur
Member  3/6/22
5. Dr. Mamta Singh
Member  3/6/22

विश्वविद्यालय, रायपूर (छ.ग.)
सहायक कुशल पदक
विश्वविद्यालय, रायपूर (छ.ग.)

- Asst. Prof. and Head, Sai College, Bhillai
Hemchand Yadav Vishwavidyalaya, Durg
6. Mr. Sushil Kumar Sahu
Asst. Prof. and Head, Christ College, Jagdalpur
Shaheed Mahendra Karma Vishwavidyalaya, Bastar
7. Mr. Vikrant Gupta
Prof. and Head, Batmul Ashram College, Salheana
Shaheed Nand Kumar Patel University, Raigarh
8. Mr. L.K. Gavel
Asst. Prof. and Head, Govt. Ghanshyam Singh Gupt, PG College, Balod
9. Dr. Anil Kumar Sharma
Asst. Prof. and Head, A.P.S.G.M.N.S, Govt. PG College, Kawardha
10. Mr. Vishwnath Tamrakar
Asst. Prof. and Head, Sant Guru Ghasidas Govt. PG College, Kurud,
Pt. Ravishankar Shukla University, Raipur
11. Ms. Anjeeta Kujur
Asst. Prof. and Head, Govt. R.B.R.N.E.S. PG College, Jashpur
Sant Gahira Guru University Sarguja, Ambikapur
12. Mr. Suresh Kumar Thakur
Asst. Prof. and Head, Indira Gandhi Govt. PG College, Vaishali Nagar
Hemchand Yadav Vishwavidyalaya, Durg
13. Dr. Ugrasen Suman
Prof. and Head, Dept. of Computer Science
Devi Ahila Vishwavidyalaya, Indore
- Member *Sushil*
31/06/2022
- Member *Sushil*
- Member *Gauj*
03/06/22
- Member *Amms*
03/06/22
- Member *Vinod*
03/06/22
Not agree because
Syllabus is denary
- Member *Anjeeta*
03/06/22
- Member *Suresh*
03/06/22
- Member
(Present Online)

Date: 03.06.2022

Sushil
अध्यक्ष
जयप्रियम मंडल
राजीव नंदकुमार पटेल
विश्वविद्यालय, रायगढ़ (उ.प्र.)

Scheme of B. Sc. Chemistry

Year	Course Code	Subject Name	Theory/ Practical	Total Credit	Total Marks	
					Max	Min
					50	17
					50	17
					50	17
Second year	CHEM-3T	Inorganic and Physical Chemistry	Theory	4	50	17
	CHEM-4T	Organic and Physical Chemistry	Theory	4	50	17
	CHEM-2P	LAB 2 : General Chemistry-2	Practical	2	50	17

Note: There shall be four extra credits in each year for internship/apprenticeship. The certificate of extra credits for this would be provided by the concern university and it is not mandatory.

Lucy
Chairman

Head of Studies
Sheel Nandkumar Patel
Widyalaya, Raigarh (C.G.)

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Part A: Introduction

Program: Diploma Course		Class: B.Sc. II Year	Year: 2023	Session: 2023-24
1.	Course Code	CHEM-3T		
2.	Course Title	Inorganic and Physical Chemistry		
3.	Course Type	Theory		
4.	Pre-requisite (if any)	To Study this course our students must have had the subject chemistry in class B.Sc. I Year/ Certificate Course or equivalent		
5.	Course Learning Outcomes (CLO)	At the end of this course, the students will be able to learn the following aspects of Chemistry <ul style="list-style-type: none"> • Understand the general characteristics of transition elements. • Explain the chemistry of Coordination Compounds. • Analyze water and coal. • Basic concepts of thermodynamics. • Basic concepts of Chemical and Ionic Equilibrium 		
6.	Credit Value	Theory: 4		
7.	Total Marks	Max. Marks: 50	Min. Passing Marks: 17	

Part B: Content of the Course

Total No. of Lectures: 90

Unit	Topics	No. of Lectures
I	<p>Chemistry of transition series elements: Transition elements- Position in periodic table, electronic configuration, General characteristics, viz., atomic and ionic radii, variable oxidation states, ability to form complexes, formation of colored ions, magnetic moment μ_{so} (spin only) and μ_{eff} and catalytic behaviour. General comparative treatment of 4d and 5d elements with their 3d analogues with respect to ionic radii, oxidation states and magnetic properties.</p> <p>Chemistry of lanthanides and actinides: Electronic structure, oxidation states and ionic radii and lanthanide and actinide contraction, complex formation. Chemistry of separation of Np, Pu, and Am from Uranium. Later actinides and later lanthanides.</p>	15
II	<p>Concepts of acids and bases: Arrhenius theory, Bronsted-Lowry concepts, conjugate acids and bases, relative strength of acids and bases, Lewis concepts of acids and bases,</p> <p>Hard and soft acids and bases (HSAB): Classification of acids and bases as hard and soft. Pearson's HSAB concept, acid-base strength, hardness and softness. Symbiosis, Applications of HSAB principle.</p> <p>Non- aqueous solvents: Physical properties of a solvent, types of solvents and their general characteristics, reaction in non-aqueous solvents with reference to liquid ammonia, liquid sulphur dioxide, sulphuric acid, liquid HF, ionic liquids.</p>	15
III	<p>Coordination chemistry: Werner's theory and its experimental verification, IUPAC nomenclature of coordination compounds, Chelates, polynuclear complexes, Isomerism in coordination compound, stereochemistry of complexes 4 & 6 coordination compounds.</p>	15

Accepted
8/6

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	Valence bond theory (inner and outer orbital complexes) : Limitations of valence bond theory, electroneutrality principle and back bonding. Crystal field theory, Crystal field splitting and stabilization energy, measurement of $10 Dq (\Delta_o)$. CFSE in weak and strong fields, pairing energies, factors affecting the magnitude of $10 Dq (\Delta_o, \Delta_t)$. Octahedral vs. tetrahedral coordination.	
IV	Chemistry of water analysis: Water quality parameters and its determination – Acidity and alkalinity of water, Total dissolved solid (TDS), Hardness of water, Chloride, Phosphate, Fluoride, Dissolved Oxygen, Chemical oxygen demand, Biological oxygen demand. Coal analysis: Classification of coal, Proximate and Ultimate analysis of coal, Carbonization of coal, Coal gas-composition and uses.	15
V	Thermodynamics: Basics of Thermodynamics, brief review of zeroth and first law of thermodynamics. Concept of heat capacity, Relation between heat capacities, Joule-Thomson expansion, inversion temperature of gases, Joule Thomson coefficient of ideal and real gases. Second law of thermodynamics: Spontaneous process, second law. Statement of Carnot cycle and efficiency of heat engine, Carnot's theorem, thermodynamic state of temperature. Concept of entropy: Entropy change in a reversible and irreversible process, entropy change in isothermal reversible expansion of an ideal gas, entropy change in isothermal mixing of ideal gases, physical significance of entropy, Molecular and statistical interpretation of entropy, Gibbs and Helmholtz free energy, variation of G and A with pressure, volume, temperature, Gibbs-Helmholtz equation, Maxwell relations, Nernst heat theorem, Elementary idea of Third law of Thermodynamics, concept of residual entropy, calculation of absolute entropy of molecule.	15
VI	Chemical equilibrium: Criteria of thermodynamic equilibrium, degree of advancement of reaction, chemical equilibria in ideal gases. Concept of Fugacity, Thermodynamic derivation of relation between Gibbs free energy of reaction and reaction quotient. Concept of activity, activity coefficient and ionic strength. Equilibrium constants and their quantitative dependence on temperature, pressure and concentration. Thermodynamic derivation of relations between the various equilibrium constants K_p and K_c . Le-Chatelier's principle (quantitative treatment). Equilibrium between ideal gas and a pure condensed phase. Ionic equilibrium: Ionization of weak acids and bases, pH scale, common ion effect; dissociation constants of mono protonic acids (exact treatment). Salt hydrolysis- calculation of hydrolysis constant, degree of hydrolysis and pH for different salts. Buffer solutions; derivation of Henderson equation and its applications. Solubility, solubility product of sparingly soluble salts and its applications.	15
Keywords: Transition Elements, Lanthanides and Actinides, Coordination Compounds, Redox potential, Water Analysis, Coal Analysis, Non-aqueous solvents, Carnot's theorem, Fugacity, Salt hydrolysis .		

Part C : Learning Resources

Text Books, Reference Books, Other Resources

Suggested Readings :

1. Basic Inorganic Chemistry, Cotton F.A, G. Wilkinson and P. L. Gaus, Wiley,
2. Concise Inorganic Chemistry, J. D. Lee, ELBS,
3. Concepts of Models of Inorganic Chemistry, B. Douglas, D. Mc Daniel and J. Alexander, John Wiley.
4. Inorganic Chemistry, D. E. Shriver, P. W. Atkins and C. H. Langford, Oxford.

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Swayam

Studies.....
Dr. Nandkumar Patel
Gwalara, Raigarh (C.G)

5. Inorganic Chemistry, W. W. Porterfield, Addison - Wiley.
6. Inorganic Chemistry, A. G. Sharp, ELBS.
7. Inorganic Chemistry, G. L. Miessler and D. A. Tarr, Prentice Hall.
8. Advanced Inorganic Chemistry, Satya Prakash.
9. Advanced Inorganic Chemistry, Agrawal and Agrawal
10. Advanced Inorganic Chemistry, B.R. Puri, L. R. Sharma, S. Chand Publication
11. Inorganic Chemistry, R. D. Madan, S. Chand Publication.
12. Aadhunik Akarbanic Rasayan, A. K. Shrivastav & P. C. Jain, Goel Pub
13. Uchchattar Akarbanic Rasayan, Satya Prakash & G. D. Tuli, Shyamal-Prakashan
14. Uchchattar Akarbanic Rasayan, B. R. Puri & L. R. Sharma
15. Selected topic in Inorganic Chemistry by R. D. Madan, M. Malik & G. R. Tuli, S. Chand Publication.
16. Environmental Chemistry, A. K. De, New Age International Publishers
17. Physical Chemistry, G.M. Barrow, International Student Edition, McGraw Hill.
18. University General Chemistry, C.N.R. Rao, Macmillan.
19. Physical Chemistry, R.A. Alberty, Willey Eastern.
20. The Elements of Physical Chemistry, Willey Eastern.
21. Physical Chemistry through problems, S.K. Dogra, Willey Eastern.
22. Physical Chemistry, B.D. Khosla.
23. Physical Chemistry, B.R. Puri and L. R. Sharma.
24. Physical Chemistry, R.L. Kapoor, Vol. I-IV.

E- Learning Resources:

1. <http://heecontent.upsdc.gov.in/Home.aspx>
2. <https://nptel.ac.in/courses/104/106/104106096/>
3. <http://heecontent.upsdc.gov.in/Home.aspx>
4. <https://nptel.ac.in/courses/104/106/104106096/>
5. <https://www2.chemistry.msu.edu/faculty/reusch/VirtTxtJml/intro1.htm>
6. <https://nptel.ac.in/courses/104/103/104103071/#>


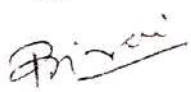
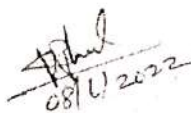

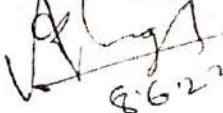
Fundamental Chemistry related topics on SWAYAM platform and E-pathshala

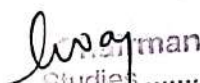
Part D: Assessment and Evaluation

Maximum Marks: 50

DECLARATION

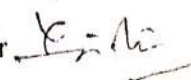
This is to certify that the syllabus is framed by the Central Board of Studies (Chemistry) as per the guidelines (TOR) of the Department of Higher Education, Raipur Chhattisgarh.

- | | | |
|--|------------|---|
| 1. Dr. Alka Shrivastav,
Assistant Professor,
Govt. E.V.P.G. College, Korba | - Chairman |  |
| 2. Smt. Priyanka Tiwari,
Assistant Professor,
Govt. J.P. Verma P.G. College, Bilaspur (C.G.) | - Member |  |
| 3. Mr. Vijay Kumar Lahare,
Assistant Professor,
Govt. Lahiri P.G. College Chirimiri(C.G.) | - Member | 
08/11/2022 |
| 4. Dr. Rajmani Patel,
Assistant Professor,
Hemchand Yadav University, Durg (C.G.) | - Member | 
08.08.22 |
| 5. Dr. A.K. Singh,
Professor,
Govt. V.Y.T. P.G. College Durg (C.G.) | - Member | 
8/6/22 |



Nandkumar Patel
Raigalaya, Raigarh (C.G.)


6. Dr. P.K. Singh,
Assistant Professor,
Govt. T.C.L. P.G. College Janjgir(C.G.)
7. Dr. P.K. Agnihotri,
Professor,
Govt. Yuganandam Chhattisgarh College Raipur(C.G.)
8. Dr. B.D. Diwan,
Professor,
Govt. M.M.R. P.G. College Champa(C.G.)
9. Dr. Sandhya Patre,
Assistant Professor,
Sant Shiromani Guru Ravidas Govt. College Sargaon,
Mungeli(C.G.)
10. Mrs. Mousami Lahare,
Assistant Professor,
Govt. G.N.A. P.G. College Bhatapara, (C.G.)
11. Dr. Alka Shukla,
Assistant Professor,
Mohan Lal Jain(Mohan Bhaiya) Govt. College Khursipar,
Bhilai(C.G.)
12. Dr. Arti Gupta,
Professor, Govt. Dr. W.W.P. Girl's P.G. College Durg (C.G.)
13. Dr. Deepti Tikariha,
Assistant Professor, APSGMNS Govt. P.G. College
Kawardha(C.G.)
14. Dr. Seema Negi,
Assistant Professor, Govt. J.M.P. College, Takhatpur (C.G.)
15. Dr. Vikesh Kumar Jha,
Assistant Professor, Govt. R.R.M. P.G. College Surajpur
(C.G.)
16. Dr. Ashish Tiwari,
Assistant Professor,
Dr. Bhimrao Ambedkar Govt. College Pamgarh(C.G.)
17. Mr. Laxmi Chand Manwani,
Assistant Professor,
Government Vivekand PG College Manendragarh(C.G.)
18. Dr. K. Indira
Professor,
Government K. PG College Jagadalpur (C.G.)

- Member 

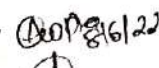
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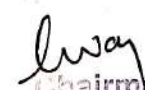
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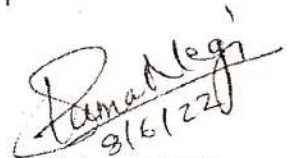
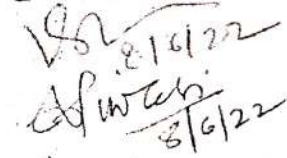
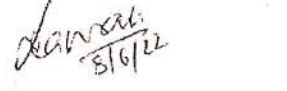
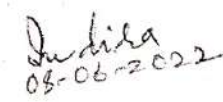
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Chairman
Studies
Nandkumar Patel
Jyalyaya, Raigarh (C.G.)


3/6/22

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05-06-2022

Part A: Introduction

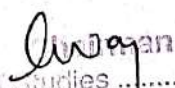
Program: Diploma Course		Class: B.Sc. II Year	Year: 2023	Session: 2023-24
1.	Course Code	CHEM-4T		
2.	Course Title	Organic and Physical Chemistry		
3.	Course Type	Theory		
4.	Pre-requisite (if any)	To Study this course our students must have had the subject chemistry in class B.Sc. I Year/ Certificate Course or equivalent		
5.	Course Learning Outcomes (CLO)	At the end of this course, the students will be able to learn the following aspects of Chemistry: <ul style="list-style-type: none"> • Reactions of the alcohols and phenols. • Reactivity of carbonyl compounds • Carboxylic acid and its derivatives • Organic compounds containing nitrogen • Phase Equilibrium • Electrochemistry 		
6.	Credit Value	Theory: 4		
7.	Total Marks	Max. Marks: 50	Min. Passing Marks: 17	

Part B: Content of the Course

Total No. of Lecturers: 90

Unit	Topics	No. of Lectures
I	<p>Chemistry of organic halides: Alkyl halides: Methods of preparation, nucleophilic substitution reactions – S_N1, S_N2 and S_Ni mechanisms with stereochemical aspects and effect of solvent etc.; nucleophilic substitution, elimination reactions.</p> <p>Aryl halides: Preparation, including preparation from diazonium salts, Nucleophilic Aromatic Substitution; S_NAr, Benzyne mechanism. Relative reactivity of alkyl, allyl/benzyl, vinyl and aryl halides towards nucleophilic substitution reactions.</p> <p>Alcohols: Dihydric alcohols – methods of formation, chemical reactions of vicinal glycols, oxidative cleavage [$Pb(OAc)_4$ and HIO_4] and pinacol-pinacolone rearrangement.</p> <p>Trihydric alcohols - Nomenclature, methods of formation, chemical reactions of glycerol.</p> <p>Phenols: Structure and bonding in phenols, physical properties and acidic character, Comparative acidic strength of alcohols and phenols, acylation and carboxylation.</p> <p>Mechanism of Claisen rearrangement, Gatterman synthesis and Reimer-Tiemann reaction.</p>	15
II	<p>Aldehydes and ketones : Nomenclature, structure and reactivity of carbonyl group. General methods of preparation of aldehydes and ketones. Mechanism of nucleophilic addition to carbonyl groups: Benzoin and Aldol condensation. Wittig reaction, Mannich reaction and Benzil- Benzilic rearrangement. Use of acetal as protecting group, Oxidation of aldehydes. Baeyer-Villiger oxidation of Ketones, Clemmensen reduction, Wolf-Kishner reaction, $LiAlH_4$ and $NaBH_4$ reduction. Halogenation of enolizable</p>	15

A.S.S.


 Nandkumar Patel
 Jayalaya, Raigarh (C.G.)

	ketones, An introduction to α , β -unsaturated aldehydes and Ketones. Michael Addition reaction	
III	<p>Carboxylic acids : Preparation. Structure and bonding, Physical and chemical properties including, acidity of carboxylic acids, effects of substituents on acid strength, Reduction of carboxylic groups. Mechanism of decarboxylation.</p> <p>Dicarboxylic acids: Methods of formation and effect of heat and dehydrating agents, Hydroxyacids.</p> <p>Carboxylic acid derivatives : Structure of acid chlorides, esters, amides and acid anhydrides, Relative stability of acyl derivatives. Physical properties, inter-conversion of acid derivatives by nucleophilic acyl substitution. Reaction with Grignard reagents. Organo-copper and Organo-lithium compound.</p>	15
IV	<p>Organic compounds of nitrogen : Preparation of nitroalkanes and nitroarenes. Chemical reactions of nitroalkanes. Mechanism of nucleophilic substitution in nitroarenes and their reduction in acidic, neutral and alkaline medium. Reactivity, structure and nomenclature of amines, physical properties. Separation of mixture of primary, secondary and tertiary amines. Structural features affecting basicity of amines. Preparation of alkyl and aryl amines (reduction of nitro compounds and nitriles), reductive amination of aldehydic and ketonic compounds. Gabriel-Phthalimide reaction, Hofmann- Bromamide reaction. Reactions of amines. electrophilic aromatic substitution of aryl amines. Reaction of amines with nitrous acid. Synthetic transformations of aryl diazonium salts, Azo coupling.</p>	15
V	<p>Phase equilibrium : Phase rule, phase, component and degree of freedom, derivation of Gibbs phase rule, Clausius-Clayperon equation and its applications to solid-liquid, liquid-vapor and solid-vapor, limitations of phase rule, applications of phase rule to one component system: water system and sulphur system. Application of phase rule to two component system: Pb-Ag system, desilverization of lead, eutectic point. Zn-Mg system, ferric chloride-water system, sodium chloride-water system, congruent and incongruent melting point and freezing mixture</p>	15
VI	<p>Electrochemistry : Ostwald dilution law and its limitations, Elementary ideas of Debye-Huckel-Onsager's theory for strong electrolytes, relaxation and electrophoretic effects. Migration of ions: Transport number, Determination by Hittorf method and moving boundary method. Electrochemical cell-reversible and irreversible cells, conventional representation of electrochemical cells, Types of electrodes-metal-metal ion, metal-salt ion, gas, amalgam, redox electrodes. Electrode potential, Standard Redox potential, electrochemical series and its applications, derivation of Nernst equation and expression of Nernst equation for different electrodes. Calculation of ΔG, and equilibrium constant. Conductometric, pH metric and potentiometric titration.</p>	15

Keywords: Alkyl and aryl halides, Alcohols and Phenols, Carboxylic Acid and its derivatives, Carbonyl Compounds, Organic Compounds of Nitrogen, Phase Equilibrium, Phase Rule, Phase, Component and Degree of Freedom, Gibbs phase rule, Clausius-Clayperon Equation, One Component System, Two Component System, Electrochemistry, Ostwald dilution law, Debye-Huckel-Onsager's theory, Electrochemical Cells, Electrode Potential, Nernst Equation, Conductometric Titration, pH Metric Titration, Potentiometric Titration.

Part C : Learning Resources

Text Books, Reference Books, Other Resources

Suggested Readings :

1. Organic Chemistry, Morrison R.N. and Boyd R.N., Dorling Kindersley (India) Pvt. Ltd. (Pearson Education).

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2. Organic Chemistry, Finar I.I., Dorling Kindersley (India) Pvt. Ltd. (Pearson Education) Vol I.
3. Organic Chemistry, Paula Y. Bruice, 2nd Edition, Prentice-Hall, International Edition (1998).
4. Organic Chemistry, Mukherjee S.M., Singh S.P. and Kapoor R.P., Wiley Easters (New Age) Vol I, II, III.
8. Fundamentals of Organic Chemistry, Solomons T. W. G., John Wiley & Sons.
6. Organic Chemistry Carey, F.A. McGraw Hill.
7. A Guide Book of Reaction Mechanism by Peter Sykes.
9. Organic Chemistry. J. Clayden, N. Greeves. S. Warren
10. Modern Methods of Organic Synthesis. William Carruthers. Iain Coldham
11. Fundamental of Organic Chemistry. Jahn E. Mc Murry
12. Organic Chemistry Principal and Mechanism, Joel Karty
13. Reaction, rearrangements and reagents, S. N. Sanyal
14. Physical Chemistry, Puri and Sharma.
15. Bhautik Rasayan, Puri, Sharma and Pathaniya. Vishal Publishing Company.
16. P. Atkins & Julio De Paula, Physical Chemistry Oxford university Press
17. R. G. Mortimer, Physical Chemistry, 3rd ed. Elsevier
18. G. W. Castalen, Physical Chemistry, 4th Ed. Narosa.

Suggested online links:

1. <https://www2.chemistry.msu.edu/faculty/reusch/virtTxtJml/intro1.htm>

2. <https://nptel.ac.in/courses/104/103/104103071/#>

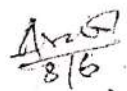





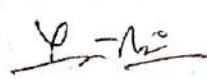
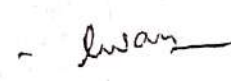
Fundamental Chemistry related topics on SWAYAM platform and E-pathshala

Part D: Assessment and Evaluation

Maximum Marks: 50

DECLARATION

This is to certify that the syllabus is framed by the Central Board of Studies (Chemistry) as per the guidelines (TOR) of the Department of Higher Education, Raipur Chhattisgarh.

- | | | |
|--|------------|---|
| 1. Dr. Alka Shrivastav,
Assistant Professor,
Govt. E.V.P.G. College, Korba | - Chairman |  |
| 2. Smt. Priyanka Tiwari,
Assistant Professor,
Govt. J.P. Verma P.G. College, Bilaspur (C.G.) | - Member |  |
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Govt. Lahiri P.G. College Chirimiri(C.G.) | - Member |  |
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Studies

..... Nandkumar Patel

..... Dyalaya, Raigarh (C.G.)

9. Dr. Sandhya Patre,
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Mungeli(C.G.)
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(C.G.)
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Assistant Professor,
Dr. Bhimrao Ambedkar Govt. College Pamgarh(C.G.)
17. Mr. Laxmi Chand Manwani,
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Government Vivekand PG College Manendragarh(C.G.)
18. Dr. K. Indira
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- Member

Patel
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- Member

Mousami

- Member

Shukla

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Deepti 8/6/22

- Member

Arti

- Member

Seema Negi
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- Member

Vikesh
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- Member

Ashish
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- Member

Laxmi
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Studies
Nandkumar Patel
Dyalaya, Raigarh (C.G)

Part A: Introduction

1. Name of the Course	Class: B.Sc. II Year	Year: 2023	Session: 2023-24
2. Course Code	CHEM-2P		
3. Course Title	Lab. 2 : General Chemistry-2		
4. Course Type	Practical		
5. Pre-requisite (if any)	To Study this course our students must have had the subject chemistry in class B.Sc. I Year/ Certificate Course or equivalent.		
6. Course Learning Outcomes (CLO)	By the end of this course students will learn the following aspects of Laboratory exercises in Chemistry : <ul style="list-style-type: none"> • To analyze the given mixture for anions (acid radicals) and cations (basic radicals). • Titrations • Qualitative Analysis • Transition Temperature. • Thermochemistry. • Water Analysis. • Phase Equilibrium 		
7. Credit Value	Practical: 2		
8. Total Marks	Max. Marks: 50	Min Passing Marks: 17	

Part B: Content of the Course

Total No. of Lecturers: 30

LABORATORY COURSE

		No. of Lectures
Tentative list of practical	Inorganic chemistry : Qualitative semimicro analysis of mixtures containing 5 radicals. Emphasis should be given to the understanding of the chemistry of different reactions. The following radicals are suggested: CO_3^{2-} , NO_2^- , S^{2-} , SO_3^{2-} , $\text{S}_2\text{O}_3^{2-}$, CH_3COO^- , F^- , Cl^- , Br^- , I^- , NO_3^- , BO_3^{3-} , $\text{C}_2\text{O}_4^{2-}$, PO_4^{3-} , NH_4^+ , K^+ , Pb^{2+} , Cu^{2+} , Cd^{2+} , Bi^{3+} , Sn^{2+} , Sb^{3+} , Fe^{3+} , Al^{3+} , Cr^{3+} , Zn^{2+} , Mn^{2+} , Co^{2+} , Ni^{2+} , Ba^{2+} , Sr^{2+} , Ca^{2+} , Mg^{2+} . Mixtures should preferably contain one interfering anion, or insoluble component (BaSO_4 , SrSO_4 , PbSO_4 , CaF_2 or Al_2O_3) or combination of anions e.g. CO_3^{2-} and SO_3^{2-} , NO_2^- and NO_3^- , Cl^- , Br^- , and I^- .	10
	Volumetric analysis <ol style="list-style-type: none"> 1. Determination of acetic acid in commercial vinegar using NaOH. 2. Determination of alkali content-antacid tablet using HCl. 3. Estimation of calcium content in chalk as calcium oxalate by permanganometry. 4. Estimation of hardness of water by EDTA. 5. Estimation of ferrous & ferric by dichromate method. 6. Estimation of copper using thiosulphate. Chromatographic separations Paper chromatographic separation of following metal ions: a) Ni (II) and Co (II) b) Fe (III) and Al (III) Paper chromatographic separation of mixture of dyes Water Analysis <ol style="list-style-type: none"> 1. Determine chemical oxygen demand (COD) of given Water sample. 2. Determine Dissolved oxygen (DO) of given Water Sample. Organic chemistry	10

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Head of Department
 Chemistry
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1. Detection of elements (X, N, S).
 2. Qualitative analysis of unknown organic compounds containing simple functional groups (alcohols, carboxylic acids, phenols, nitro, amine, amide, and carbonyl compounds, carbohydrates)
- Preparation of Organic Compounds: (i) m-dinitrobenzene, (ii) Acetanilide. (iii) Bromo/Nitro-acetanilide, (iv) Oxidation of primary alcohols-Benzoic acid from benzylalcohol, (v) azo dye.

Physical chemistry

Transition Temperature

Determination of the transition temperature of the given substance by thermometric/ dilatometric method (e.g. $\text{MnCl}_2 \cdot 4\text{H}_2\text{O}$ / $\text{SrBr}_2 \cdot 2\text{H}_2\text{O}$).

Thermochemistry

1. Determination of heat capacity of a calorimeter for different volumes using change of enthalpy data of a known system (method of back calculation of heat capacity of calorimeter from known enthalpy of solution or enthalpy of neutralization).
2. Determination of heat capacity of the calorimeter and enthalpy of neutralization of hydrochloric acid with sodium hydroxide.
3. To determine the solubility of benzoic acid at different temperature and to determine ΔH of the dissolution process.
4. To determine the enthalpy of neutralization of a weak acid/ weak base versus strong base/ strong acid and determine the enthalpy of ionization of the weak acid/ weak base.
5. To determine the enthalpy of solution of solid calcium chloride and calculate the lattice energy of calcium chloride from its enthalpy data using Born Haber cycle.

Phase Equilibrium

6. To study the effect of a solute (e.g. NaCl, Succinic acid) on the critical solution temperature of two partially miscible liquids (e.g. phenol-water system) and to determine the concentration of that solute in the given phenol-water system.
7. To construct the phase diagram of two component system (e.g. diphenylamine- benzophenone) by cooling curve method.
8. Distribution of acetic/ benzoic acid between water and cyclohexane.
9. Study the equilibrium of at least one of the following reactions by the distribution method: (i) $\text{I}_2(\text{aq}) + \text{I}^- \rightarrow \text{I}_3(\text{aq})^{2-}$ (ii) $\text{Cu}^{2+}(\text{aq}) + n\text{NH}_3 \rightarrow \text{Cu}(\text{NH}_3)_n$

Molecular Weight Determination

10. Determination of molecular weight by Rast Camphor and Landsburger method.

10

Keywords: Qualitative semimicro analysis. Paper chromatographic Water Analysis. Transition Temperature Thermochemistry Molecular Weight.

Part C: Learning Resource

Suggested Readings :

1. Mendham, J., A. I. Vogel's Quantitative Chemical Analysis 6th Ed., Pearson, 2009.
2. Ahluwalia, V. K., Dhingra, S. and Gulati, A. College practical Chemistry, University Press.
3. Mann, F.G. & Saunders, B.C. Practical Organic Chemistry, Pearson Education (2009).
4. Furniss, B.S.; Hannaford, A.J.; Smith, P.W.G.; Tatchell, A.R. Practical Organic Chemistry, 5th Ed., Pearson (2012)
5. Khosla, B. D.; Garg, V. C. & Gulati, A. Senior Practical Physical Chemistry, R. Chand & Co.: New Delhi (2011).

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Studies

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Delhi

- Assistant Professor,
Govt. J.P. Verma P.G. College, Bilaspur (C.G.)
3. Mr. Vijay Kumar Lahare,
Assistant Professor,
Govt. Lahiri P.G. College Chirimiri(C.G.)
4. Dr. Rajmani Patel,
Assistant Professor,
Hemchand Yadav University, Durg (C.G.)
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Govt. T.C.L. P.G. College Janjgir(C.G.)
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Govt. Yuganandam Chhattisgarh College Raipur(C.G.)
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Dr. Bhimrao Ambedkar Govt. College Pamgarh(C.G.)
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Scheme of B.Sc.-IT (Information Technology)

Year	Course Code	Subject Name	Theory/ Practical	Total Credit	Total Marks	
					Max	Min
Second	BSCIT-3T	Data Communication and Networking	Theory	4	50	17
	BSCIT-4T	Web Technology and Java	Theory	4	50	17
	BSCIT-2P	LAB 2: Web Technology and Java	Practical	2	50	17

Note: There shall be four extra credits in all the years of under graduation for internship/apprenticeship. The certificate of extra credits would be provided by the concern university and is not mandatory.

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अध्यक्ष C.S.
सहायक कुलपति
विश्वविद्यालय, रायगढ़ (छ.प्र.)

Part A: Introduction			
Program: Diploma Course		Class: B.Sc.-IT II Year	Year: 2022 Session: 2022-2023
1.	Course Code	BSCIT-3T	
2.	Course Title	Data Communication and Networking	
3.	Course Type	Theory	
4.	Pre-requisite (if any)	No	
5.	Course Learning Outcomes (CLO)	At the end of this course, the students will be able to: <ul style="list-style-type: none"> • Understand the basic computer network technology • Understand and explain the data communication system and its components. • Identify the different types of network topologies and protocols. • Understand the layers of the OSI model and TCP/IP. • Expose wireless and wired LANs. 	
6.	Credit Value	Theory: 5	
7.	Total Marks	Max. Marks: 50	Min Passing Marks: 17

Part B: Content of the Course		
Total Periods: 60		
Unit	Topics	No. of Periods
I	Overview of Data Communication and Networking: Data Communications: components, data representation, direction of data flow (simplex, half duplex, full duplex; Networks : distributed processing, network criteria, physical structure (type of connection, topology), categories of network (LAN, MAN, WAN), Protocol and standards; Reference Models: OSI & TCP/IP reference model comparative study.	12
II	Physical layer: Analog and Digital Transmission: Transmission Impairments, Data Rates Limits, Digital to Digital Conversion, Digital to Analog conversion, Analog To Digital Conversion: Modulation, Transmission Modes, Parallel, Serials Asynchronous and Synchronous communication; Constellation Diagram, Analog to Analog conversion, Bandwidth Utilization, Transmission Media: Multiplexing: FDM, WDM AND TDM, Guided Media: Twisted Pair, Coaxial and Fiber Optic, Unguided Media : Wireless, Radio Waves, Microwaves and Infrared.	12
III	Data Link Layer: Flow control: Protocols: Stop & wait ARQ, Go-Back-N ARQ, Selective repeat ARQ, HDLC; Medium Access Sub-layer: Point to point protocol, LCP, NCP, FDDI, token bus, token ring; Multiple Access Protocols: Pure ALOHA, Slotted ALOHA, CSMA, CSMA/CD, FDMA, TDMA, CDMA; Traditional Ethernet, Fast Ethernet.	12
IV	Network Layer: Internetworking Devices: Repeaters, Hubs, Bridges, Switches, Router, Gateway; Addressing: Internet address, classful address, subnetting, classless address; Routing: Techniques, static vs dynamic routing, and routing table for classful address; Routing Algorithms: Shortest path algorithm, flooding, distance vector routing, link state routing; Protocols: ARP, RARP, IP, ICMP, IPV6; Unicast and multicast routing protocols;	12

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 राजका मंडल
 श्रीरामसुन्दर पतेल
 विश्वविद्यालय, रायगढ़ (उ.प्र.)

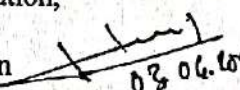
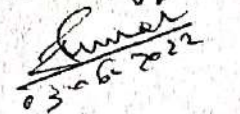
v.	Transport Layer and Application Layer: UDP,TCP; Congestion control algorithm: Leaky bucket algorithm, Token bucket algorithm, choke packets; Quality of service: techniques to improve Qos; DNS,SMTP, SNMP,FTP, HTTP, Firewalls; Modern Topics: Wireless LAN: IEEE 802.11;Introduction to Bluetooth,VLAN's, Cellular telephony & Satellite network.	12
Keywords: Networking Model, Communication Protocol, Transmission Media, Internetworking Devices.		

Part C: Learning Resources
Text Books, Reference Books, Other Resources
Suggested Readings: <ol style="list-style-type: none"> 1. Data Communications and Networking, B.A. Forouzan, TMH, (Latest Edition) 2. Computer Networks, A.S. Tanenbaum, 4th Edition, Pearson Education/PHI 3. Data and Computer Communication, W. Stallings, 5th Edition, PHI/Pearson Education 4. Computer Networking – A top down approach featuring the internet, Kurose and Rose, Pearson Education. 5. Communication Networks, Walrand, TMH (Latest Edition)
E Resources: <ol style="list-style-type: none"> 1. NPTEL URL link for Data Communication: https://nptel.ac.in/courses/106105082 Topics From SWAYAM Portal 2. Introduction to Data Communication https://www.youtube.com/watch?v=swtH_okidQc&list=PLUfVcb-ign8dG1-Cn7NTEdILR3hRVgcN&index=1 3. Layered Architecture https://www.youtube.com/watch?v=xHO6LjSHeo0&list=PLUfVcb-ign8dG1-Cn7NTEdILR3hRVgcN&index=2 4. Data and Signal https://www.youtube.com/watch?v=6ZGVZ7gUccE&list=PLUfVcb-ign8dG1-Cn7NTEdILR3hRVgcN&index=3 5. Guided Transmission Media https://www.youtube.com/watch?v=y7v3EAJsWXA&list=PLUfVcb-ign8dG1-Cn7NTEdILR3hRVgcN&index=5 6. Unguided Transmission Media https://www.youtube.com/watch?v=hKq1tYIVxdQ&list=PLUfVcb-ign8dG1-Cn7NTEdILR3hRVgcN&index=6
Part D: Assessment and Evaluation
Maximum Marks: 50

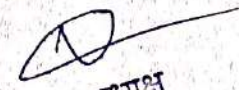
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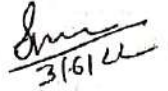


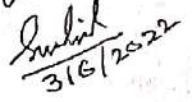
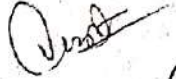

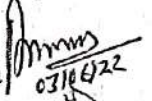
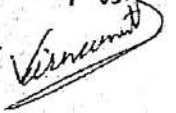
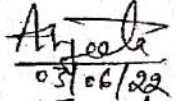
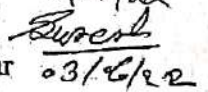
The syllabus of this subject is frame as per the TOR of department of higher education, Chhattisgarh.

1. Dr. H.S. Hota
Prof. and Head, Dept. of Computer Science and Application
2. Dr. Sanjay Kumar

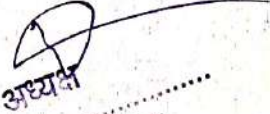
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03.06.2022


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संस्कृत मंडल
शशिब नंदकुमार फडके
सामाजिक विद्यालय, रायपुर (छ.ग.)

- Prof. and Head, SoS in Computer Science, Pt. Ravishankar Shukla University,
Raipur
3. Mr. Jitendra Kumar - Member 
Asst. Prof., Dept. of Computer Science and Application
Atal Bihari Vajpayee Vishwavidyalaya, Bilaspur
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Sant Gahira Guru University Sarguja, Ambikapur
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Shaheed Nand Kumar Patel University, Raigarh
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 9. Dr. Anil Kumar Sharma - Member 
Asst. Prof. and Head, A.P.S.G.M.N.S, Govt. PG College, Kawardha
Hemchand Yadav Vishwavidyalaya, Durg
 10. Mr. Vishwnath Tamrakar - Member 
Asst. Prof. and Head, Sant Guru Ghasidas Govt. PG College, Kurud,
Pt. Ravishankar Shukla University, Raipur
 11. Ms. Anjeeta Kujur - Member 
Asst. Prof. and Head, Govt. R.B.R.N.E.S. PG College, Jashpur
Sant Gahira Guru University Sarguja, Ambikapur
 12. Mr. Suresh Kumar Thakur - Member 
Asst. Prof. and Head, Indira Gandhi Govt. PG College, Vaishali Nagar
Hemchand Yadav Vishwavidyalaya, Durg
 13. Dr. Ugrasen Suman - Member
Prof. and Head, Dept. of Computer Science
Devi Ahila Vishwavidyalaya, Indore (Present Online)

Date: 03.06.2022


अध्यक्ष
राष्ट्रीय मंडल
शाहीब मुकुता मंडल
राज्य मंडल, रायपुर (M.T.)

Part A: Introduction			
Program: Diploma Course	Class: B.Sc.-IT II Year	Year: 2022	Session:2022-2023
1. Course Code	BSCIT-4T		
2. Course Title	Web Technology and Java		
3. Course Type	Theory		
4. Pre-requisite (if any)	Basic understanding of programming concepts and programming language		
5. Course Learning Outcomes (CLO)	<p>At the end of this course, the students will be able to:</p> <ul style="list-style-type: none"> ● Create applications using HTML, CSS and Java Script. ● Understand fundamental tools and technologies for web design. ● Specify design rules in constructing web pages and sites. ● Understand how Web pages are designed and created. ● Design console-based GUI based and Web based application. ● Front end designing using html, CSS, java script and bootstrap. ● Develop server-side programs in the form of Servlet. ● Designing Web application by using JSP as a server-side programming. ● Design and implement dynamic websites with good aesthetic sense of designing and latest technical know-how's Create web pages using HTML and Cascading Styles sheets. ● Analyze a web page and identify its elements and attributes Create dynamic web pages using JavaScript. ● Build web applications using jsp and Servlet. 		
6. Credit Value	Theory:4		
7. Total Marks	Max. Marks: 50	Min Passing Marks : 17	

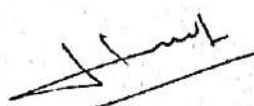
Part B: Content of the Course		
Total Periods: 60		
Unit	Topics	No. of Periods
I	<p>Introduction: Overview of WWW, Web page, Web browsers, HTTP, URL, Hypertext, Web server, Tools for web site development, hosting options and domain name registration.</p> <p>Markup language: Introduction, DTD, Creating Web pages, Headings, Paragraphs, Lists, Hyperlinks, Tables, Web forms, Input Types, Input Attributes, Inserting images, Frames, Basics of DHTML, XML , XHTML.</p>	12
II	<p>Web Development: CSS-Introduction, Syntax, measurement units, colors, Backgrounds, Font, Text, position, Align, Images, Link, Table, List, Padding.</p> <p>JavaScript: Overview, syntax, Variables, Operators, Decision control statement, Looping statement, JavaScript functions, Java script Events, Cookies, Page Redirect, and Validation.</p> <p>Bootstrap: Introduction, Grid system, typography, tables, images, dropdowns, jumbotron, them, template and forms.</p> <p>PHP: Introduction, syntax, variables, operators, functions, include, get method, post method, cookies, session, PHP form validation, exception.</p>	12


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 अध्यक्ष
 राजेश चंद्रकुमार पटेल
 विश्वविद्यालय, रायगढ़ (उ.प्र.)

III	JAVA: Primitive Data Types, Variables, Array, operators, control statements, classes and objects, Abstract Classes, Polymorphism, Inheritance, Method Over-writing, method overriding, constructor, super keyword, this keyword, final static, package and interface, Multi-threading and Exception Handling, Collection Framework. Introduction to applet.	12
IV	Java Server Page (JSP): Basics of Servlet, writing simple program in Servlet, Introduction to Java Server Page (JSP), Embedding Java Code into HTML, Implicit JSP Objects, Overview of the JSP Tags, Directives, Declarations, Expressions, Deploying Servlet and JSP, JSTL, JSP Action elements: jsp:forward, jsp:include, JSP Request, JSP Response, JSP Config, JSP Session, Cookies, JSP Exception Handling.	12
V	Database Using JDBC: Concept, JDBC Driver Types, JDBC package, establishing a database connection and executing SQL Statements.	12
Keywords: Web Designing, Collection Framework, Servlet, JSP, JDBC, Database Connectivity.		

Part C: Learning Resources	
Text Books, Reference Books, Other Resources	
Suggested Readings:	
<ol style="list-style-type: none"> 1. The Complete Reference JAVA, Herbert Scheldt, Tata McGraw Hill publication, 5^o Edition. 2. Advance JAVA, Gajendra Gupta, Firewall Media, 1^o Edition, 2006. 3. JAVA network programming, Elliotte Rusty Harold, O'Reilly Publication, 3^o Edition. 4. Core Java for Beginners, Rashmi Kanta Das, Vikas Publishing House Pvt. Ltd. 5. Internet and Internet Engineering, Daniel Minoli, TMH (Latest Edition) 6. Java Script, Gosslin, Vikas (Latest Edition) 7. HTML The Definite Guide, Chuck musiano & Bill Kenndy, O Reilly (Latest Edition). 	
E Resources:	
1. Introduction to web-app	https://www.youtube.com/watch?v=Iznp3tRRTzw&list=PLJ5C_6qdAvBEJ6-TBzKoa1Ov21lwDzJfM&index=22
2. Building web-app	https://www.youtube.com/watch?v=k1En4LqAQIE&list=PLJ5C_6qdAvBEJ6-TBzKoa1Ov21lwDzJfM&index=3
3. Introduction to Java Script	https://www.youtube.com/watch?v=fRbP92oScp0&list=PLJ5C_6qdAvBEJ6-TBzKoa1Ov21lwDzJfM&index=10
4. Introduction to Database	https://www.youtube.com/watch?v=mtc0HHrUKpl&list=PLJ5C_6qdAvBEJ6-TBzKoa1Ov21lwDzJfM&index=12
5. Introduction to SQL	https://www.youtube.com/watch?v=ar2naKy0aPw&list=PLJ5C_6qdAvBEJ6-TBzKoa1Ov21lwDzJfM&index=16
6. Introduction to Java	https://www.youtube.com/watch?v=OjdT21-EZJA&list=PLfn3cNtmZdPOe3R_wO_h540QNfMkCQ0ho&index=1 https://www.w3schools.com/java/

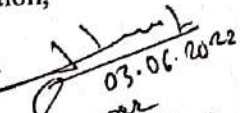
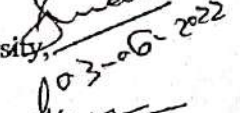
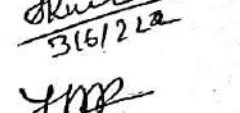

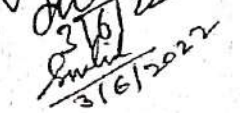


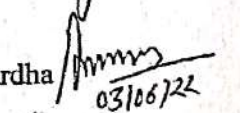
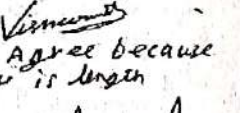
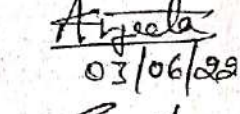
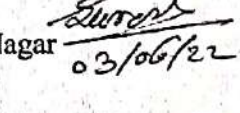




अध्यक्ष
राजस्थान संसद
श्रीदीप मंदकुमार संसद
विश्वविद्यालय, रायगढ़ (उ.प्र.)

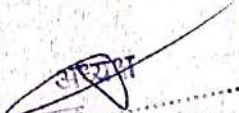
7. Introduction to Web Technology: https://www.w3schools.com/
Part D:Assessment and Evaluation
Maximum Marks: 50

Declaration

The syllabus of this subject is frame as per the TOR of department of higher education, Chhattisgarh.

- | | | | |
|--|---|----------------------------|---|
| 1. Dr. H.S. Hota
Prof. and Head, Dept. of Computer Science and Application | - | Chairman | 
03.06.2022 |
| 2. Dr. Sanjay Kumar
Prof. and Head, SoS in Computer Science, Pt. Ravishankar Shukla University,
Raipur | - | Member | 
03-06-2022 |
| 3. Mr. Jitendra Kumar
Asst. Prof., Dept. of Computer Science and Application
Atal Bihari Vajpayee Vishwavidyalaya, Bilaspur | - | Member | 
31/6/22 |
| 4. Mr. H.S.P. Tonde
Asst. Prof. and Head, Dept. of Computer Science,
Sant Gahira Guru University Sarguja, Ambikapur | - | Member | 
Tonde |
| 5. Dr. Mamta Singh
Asst. Prof. and Head, Sai College, Bhilai
Hemchand Yadav Vishwavidyalaya, Durg | - | Member | 
31/6/22 |
| 6. Mr. Sushil Kumar Sahu
Asst. Prof. and Head, Christ College, Jagdalpur
Shaheed Mahendra Karma Vishwavidyalaya, Bastar | - | Member | 
31/6/2022 |
| 7. Mr. Vikrant Gupta
Prof. and Head, Batmul Ashram College, Salheana
Shaheed Nand Kumar Patel University, Raigarh | - | Member | 
03/06/22 |
| 8. Mr. L.K. Gavel
Asst. Prof. and Head, Govt. Ghanshyam Singh Gupt, PG College, Balod
Hemchand Yadav Vishwavidyalaya, Durg | - | Member | 
03/06/22 |
| 9. Dr. Anil Kumar Sharma
Asst. Prof. and Head, A.P.S.G.M.N.S, Govt. PG College, Kawardha
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03/06/22 |
| 10. Mr. Vishwnath Tamrakar
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Pt. Ravishankar Shukla University, Raipur | - | Member | 
Not Agree because
Syllabus is wrong |
| 11. Ms. Anjeeta Kujur
Asst. Prof. and Head, Govt. R.B.R.N.E.S. PG College, Jashpur
Sant Gahira Guru University Sarguja, Ambikapur | - | Member | 
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03/06/22 |
| 13. Dr. Ugrasen Suman
Prof. and Head, Dept. of Computer Science
Devi Ahila Vishwavidyalaya, Indore | - | Member
(Present Online) | |

Date: 03.06.2022


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विश्वविद्यालय, रायगढ़ (छ.ग.)

Part A: Introduction			
Program: Diploma Course		Class: B.Sc.-IT II Year	Year: 2022 Session: 2022-2023
1.	Course Code	BSCIT-2P	
2.	Course Title	LAB: Web Technology and JAVA	
3.	Course Type	Practical	
4.	Pre-requisite (if any)	Theoretical knowledge of HTML, CSS, JavaScript and JAVA	
5.	Course Learning Outcomes (CLO)	<p>At the end of course, Students will be able to:</p> <ul style="list-style-type: none"> • Develop web-based application. • Develop front end application using front end technologies. • Demonstrate the principles of object-oriented programming. • Create multi-threaded programs and event handling mechanisms • Develop simple GUI interfaces for a computer program to interact with users. • Use form validation on web page. • Develop server-based application using Servlet and JSP. 	
6.	Credit Value	Practical: 2	
7.	Total Marks	Max. Marks: 50	Min Passing Marks : 17

Part B: Content of the Course	
Total Periods: 30	
Tentative Practical List	<p>Note: This is tentative list; the teachers concern can add more program as per requirement.</p> <p>Developing Web based application based on the concept of Web design technologies and Java programming.</p> <ol style="list-style-type: none"> 1. Design a Login Page by using HTML and CSS. 2. Write a program to perform validation on web page. 3. Design a web page to demonstrate registration form of student. 4. Design a from by using HTML and CSS who will take input from the user through Java-script Function and check weather it is integer or not. 5. Design a device friendly web page which should be able to resize the display depending on the device by using bootstrap. 6. Write a java program to create an abstract class named shape that contains two integers and an empty method named print Area () Provide three classes named Rectangle. Triangle and Circle such that each one of the classes extends the class shape. Each one of the class contains only the method print Area () that print the area of the given shape. 7. Write a Java program that implements a multithreaded program that has three threads. First thread generates a random integer every 1 second and if the value

अध्यक्ष

सहायक कुलाचार्य (अ.प्र.)
विश्वविद्यालय, रायगढ़ (उ.प्र.)

- is odd the third thread will print the value of the cube of the number.
8. Write a java program which creates a list containing ice cream flavours. On selection of any flavour price should be displayed in a text field.
 9. Write a JDBC program to create a table product (id number, name varchar. Price varchar). And insert a record in the table.
 10. Write a program to execute a select query using JDBC.
 11. Write a program to execute an Update query using JDBC.
 12. Write a server program to return the square root of a number to the client using Socket.
 13. Write a server program to return Date and time to clients using socket programming.
 14. Write a JSP program for basic arithmetic functions.
 15. Write a advance java program to implement registration of student by using JSP.
 16. Write a program to design a web page for login form and connect to the database while using JSP and JDBC.
 17. Write a program to design a simple calculator using
(a) JavaScript (b) Servlet and (c) JSP.
 18. A web application that lists all cookies stored in the browser on clicking "List Cookies" button. Add cookies if necessary.
 19. Write a java program that connects to a database using JDBC and does add, deletes, modify and retrieve operations.
 20. Develop an applet that displays a simple message.

Part C: Learning Resources

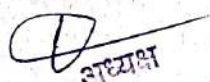
Text Books, Reference Books, Other Resources

Suggested Readings:

1. The Complete Reference JAVA, Herbert Scheldt, Tata McGraw Hill publication, 5th Edition.
2. Advance JAVA, Gajendra Gupta, Firewall Media, 1st Edition, 2006.
3. JAVA network programming, Elliotte Rusty Harold, O'Reilly Publication, 3rd Edition.
4. Core Java for Beginners, Rashmi Kanta Das, Vikas Publishing House Pvt. Ltd.
5. Internet and Internet Engineering, Daniel Minoli, TMH (Latest Edition)
6. Java Script, Gosslin, Vikas (Latest Edition)
7. HTML The Definite Guide, Chuck musiano & Bill Kenndy, O Reilly (Latest Edition).

E Resources:

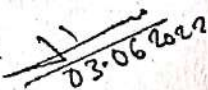
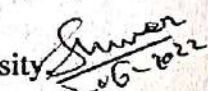
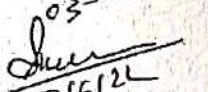
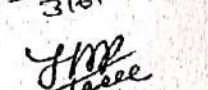
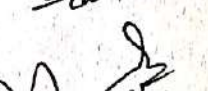


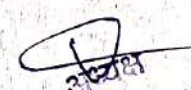

 अध्यक्ष
 राज्यपाल मंडल
 राजीव नंदकुमार पटेल
 विश्वविद्यालय, रायगढ़ (छ.ग.)

<p style="text-align: center;">TBzKoa1Ov21lwDzJfM&index=22</p> <ul style="list-style-type: none"> • Building web-app https://www.youtube.com/watch?v=kIE4LqAQIE&list=PLJ5C_6qdAvBEJ6-TBzKoa1Ov21lwDzJfM&index=3 • Introduction to Java Script https://www.youtube.com/watch?v=fRbP92oScp0&list=PLJ5C_6qdAvBEJ6-TBzKoa1Ov21lwDzJfM&index=10 • Introduction to Database https://www.youtube.com/watch?v=mtc0HHrUKpl&list=PLJ5C_6qdAvBEJ6-TBzKoa1Ov21lwDzJfM&index=12 • Introduction to SQL https://www.youtube.com/watch?v=ar2naKy0aPw&list=PLJ5C_6qdAvBEJ6-TBzKoa1Ov21lwDzJfM&index=16 • Introduction to Java https://www.youtube.com/watch?v=OjdT2l-EZJA&list=PLfn3cNtmZdPOe3R_wO_h540QNfMkCQ0ho&index=1 		
Part D: Assessment and Evaluation		
Suggested Continuous Evaluation Methods:		
Maximum Marks: 50		
Continuous Comprehensive Evaluation (CCE): Not Applicable		
University Exam(UE): 50 Marks		
Internal Assessment: Continuous Comprehensive Evaluation (CCE)	Class Test/Assignment/Presentation	Not Applicable

Declaration

The syllabus of this subject is frame as per the TOR of department of higher education, Chhattisgarh.

- | | | | |
|--|---|----------|---|
| 1. Dr. H.S. Hota
Prof. and Head, Dept. of Computer Science and Application | - | Chairman | 
03-06-2022 |
| 2. Dr. Sanjay Kumar
Prof. and Head, SoS in Computer Science, Pt. Ravishankar Shukla University Raipur | - | Member | 
03-06-2022 |
| 3. Mr. Jitendra Kumar
Asst. Prof., Dept. of Computer Science and Application Atal Bihari Vajpayee Vishwavidyalaya, Bilaspur | - | Member | 
3/6/22 |
| 4. Mr. H.S.P. Tonde
Asst. Prof. and Head, Dept. of Computer Science, Sant Gahira Guru University Sarguja, Ambikapur | - | Member | 
3/6/22 |
| 5. Dr. Mamta Singh | - | Member | 
3/6/22 |


अध्यक्ष
विश्वविद्यालय, रायपुर (उ.प्र.)

- Asst. Prof. and Head, Sai College, Bhilai
Hemchand Yadav Vishwavidyalaya, Durg
6. Mr. Sushil Kumar Sahu - Member *Sushil*
31/6/2022
- Asst. Prof. and Head, Christ College, Jagdalpur
Shaheed Mahendra Karma Vishwavidyalaya, Bastar
7. Mr. Vikrant Gupta - Member *Vikrant*
- Prof. and Head, Batmul Ashram College, Salheana
Shaheed Nand Kumar Patel University, Raigarh
8. Mr. L.K. Gavel - Member *L.K. Gavel*
03/06/22
- Asst. Prof. and Head, Govt. Ghanshyam Singh Gupt, PG College, Balod
Hemchand Yadav Vishwavidyalaya, Durg
9. Dr. Anil Kumar Sharma - Member *Anil*
05/06/22
- Asst. Prof. and Head, A.P.S.G.M.N.S, Govt. PG College, Kawardha
Hemchand Yadav Vishwavidyalaya, Durg
10. Mr. Vishwnath Tamrakar - Member *Vishwnath*
03/06/22
Not agreed bcz syllabus is lengthy.
- Asst. Prof. and Head, Sant Guru Ghasidas Govt. PG College, Kurud,
Pt. Ravishankar Shukla University, Raipur
11. Ms. Anjeeta Kujur - Member *Anjeeta*
03/06/22
- Asst. Prof. and Head, Govt. R.B.R.N.E.S. PG College, Jashpur
Sant Gahira Guru University Sarguja, Ambikapur
12. Mr. Suresh Kumar Thakur - Member *Suresh*
03/06/22
- Asst. Prof. and Head, Indira Gandhi Govt. PG College, Vaishali Nagar
Hemchand Yadav Vishwavidyalaya, Durg
13. Dr. Ugrasen Suman - Member
(Present Online)
- Prof. and Head, Dept. of Computer Science
Devi Ahila Vishwavidyalaya, Indore


Date: 03.06.2022

[Signature]
अध्यक्ष
जयप्रकाश मंडल
राजीव मंदकूमर पटेल
विश्वविद्यालय, रायगढ़ (छ.प्र.)

Scheme of B. Sc. Mathematics

Year	Course Code	Subject Name	Theory/ Practical	Total Credit	Total Marks		
					Max	Min	
First year	MATH-1T	Calculus	Theory	4	50	33	
	MATH-2T	Algebra	Theory	4	50		
	MATH-1P (Any One)	Lab 1 : Calculus and Algebra	Practical	2	50	17	
		Project 1 : History of Mathematicians	Project	2	50	17	
Second year	MATH-3T	Differential Equations	Theory	4	50	33	
	MATH-4T	Real Analysis	Theory	4	50		
	MATH-2P (Any One)	Lab 2 : Differential Equations and Real Analysis	Practical	2	50	17	
		Project 2 : History of Mathematicians	Project	2	50	17	
Third year	MATH-5T Optional I (Any One)	Mechanics	Theory	4	50	33	
		Numerical Methods	Theory	4	50		
		Linear Algebra	Theory	4	50		
		Integral Transforms and Fourier Analysis	Theory	4	50		
	MATH-6T Optional II (Any One)	Discrete Mathematics	Theory	4	50		
		Tensors and Differential Geometry	Theory	4	50		
		Number Theory	Theory	4	50		
		Probability and Statistics	Theory	4	50		
	MATH-3P (Any One)	Lab 3 : Mathematics Paper 1 and Paper 2	Practical	2	50		17
		Project 3 : History of Mathematicians	Project	2	50		17

Note: There shall be four extra credits in all the years of under graduation for internship/apprenticeship. The certificate of extra credits would be provided by the concern university and is not mandatory.



 अध्यक्ष
 मध्यम मंडल
 श्री दीप नंदकुमार पटेल
 विश्वविद्यालय, रायगढ़ (छ.ग.)


TAK


Part A: Introduction			
Program: Diploma Course		Class: B.A/ B.Sc. II Year	Year: 2022 Session: 2023-2024
1	Course Code	MATH-2P (I)	
2	Course Title	I - Lab 02 - Differential Equations and Real Analysis	
3	Course Type	Practical	
4	Pre-requisite (if any)	No	
5	Course Learning Outcomes (CLO)	<p>This course will enable the students to</p> <ul style="list-style-type: none"> • Learn Free and Open Source Software (FOSS) tools for computer programming • Solve problem on differential equations and real analysis theory studied in Mathematics Paper 1 and 2 by using FOSS software's. • Acquire knowledge of applications of Differential Equations and Real Analysis through FOSS. 	
6	Credit Value	2	
7	Total Marks	Max. Marks: 50	Min Passing Marks: 17

Part B: Content of the Course	
Total Periods: 30	
Tentative Practical List	<p>Mathematics practical with Free and Open Source Software (FOSS) tools for computer programs, such as GeoGebra/Maxima/Scilab/ Octave /Python/R.</p> <p>Course Objectives:</p> <ul style="list-style-type: none"> • To learn Free and Open Source Software (FOSS) tool for computer programming • Acquire knowledge of applications of differential equations and real analysis through FOSS <p>List of Practicals: (At least 10 practicals)</p> <ul style="list-style-type: none"> • Solution of differential equation and plotting the graph of the solution: Variable separable. • Solution of differential equation and plotting the graph of the solution: Homogeneous equations. • Solution of differential equation and plotting the graph of the solution: Linear differential equations.

अध्यक्ष
 विद्यालय संकल
 शहीद नंदकुमार पटेल
 विश्वविद्यालय, रायगढ़ (छ.प्र.)

- Solution of differential equation and plotting the solution: Bernoulli's equations
- Solution of second and higher order ordinary differential equations with constant coefficients
- Solution of second order ordinary differential equations with variable coefficients by i) Method of variation of parameters ii) When the equation is exact.
- Finding complementary function and particular integral of constant coefficient second and higher order ordinary differential equations.
- Solving second order linear partial differential equations in two variables with constant coefficient.
- Solutions to the problems on total and simultaneous differential equations.
- Solutions to the problems on different types of Partial differential equations.
- Illustration of convergent, divergent and oscillatory sequences.
- Using Cauchy's criterion to determine convergence of a sequence (simple examples).
- Illustration of convergent, divergent and oscillatory series.
- Programs to find the sum of the series and its radius of convergence.
- Using Cauchy's criterion on the sequence of partial sums of the series to determine convergence of series.
- Testing the convergence of binomial, exponential and logarithmic series and finding the sum.
- To verify the given function is Riemann integrable or not over arbitrary closed interval $[a, b]$.


 अष्टम
 अखण्ड केंद्र
 राष्ट्रीय संस्कृत विश्वविद्यालय, रायचूर (छ.प्र.)



Part C - Learning Resource		
Text Books, Reference Books, Other Resources		
SUPPORT FROM THE GOVT FOR STUDENTS AND TEACHERS IN UNDERSTANDING AND LEARNING FOSS TOOLS:		
As a national level initiative towards learning FOSS tools, IIT Bombay for MHRD, government of India is giving free training to teachers interested in learning open source software's like scilab, maxima, octave, geogebra and others. (Website: http://spoken-tutorial.org);		
(email: info@spokentutorial.org ; contact@spoken-tutorial.org)		
Part D: Assessment and Evaluation		
Suggested Continuous Evaluation Methods:		
Maximum Marks: 50		
Continuous Comprehensive Evaluation (CCE): Not Applicable		
University Exam(UE): 50 Marks		
Internal Assessment:		
Continuous Comprehensive Evaluation (CCE)	Class Test/Assignment/Presentation	Not Applicable

Declaration

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Dr. B.R. Ambedkar Govt. College, Baloda
5. Dr. Arun Kumar Mishra
Professor

Chairman



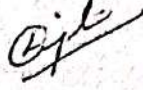
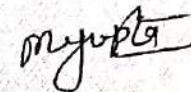
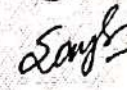

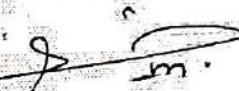
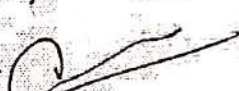


Member


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Member

Member

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विश्वविद्यालय, रायगढ़ (छ.प्र.)

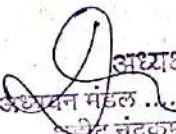
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| Govt. DT PG College, Utai | - | Member |  |
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Professor | | | |
| Govt. Digvijay PG College, Rajnandgaon | - | Member |  |
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Part A: Introduction			
Program: Diploma Course		Class: B.A./ B.Sc. II Year	Year: 2022 Session: 2023-2024
1	Course Code	MATH-2P (II)	
2	Course Title	II - Project 02 - History of Mathematician	
3	Course Type	Project	
4	Pre-requisite (if any)	No	
5	Course Learning Outcomes (CLO)	<p>Studying history of mathematicians help students:</p> <ul style="list-style-type: none"> • Develop a deeper understanding of the mathematics they have already studied by seeing how it was developed over time and in various places. • Know the rich intellectual heritage of the country. • Develop an appreciation of mathematics and build positive attitude towards mathematics increasing student's motivation decreasing anxiety related the subject. • To acquire knowledge about development of mathematics in ancient, medieval and modern period of history. 	
6	Credit Value	2	
7	Total Marks	Max. Marks: 50	Min Passing Marks : 17

Part B: Content of the Course	
Total Periods: 30	
Project List	<p>Course Objectives:</p> <p>An elective course designed to acquire special / advance knowledge, such as supplement study / support study to a project work and a candidate study such a course on his own with an advisory support by a teacher / faculty member.</p> <p>Project</p> <p>Contributions and biographies of Indian Mathematicians Aryabhata , Varahmihir , and Bhaskar I ,Shreedharacharya , Shreepati and Parmeshwar and contribution involved in contents of the paper of Differential Equations and Real Analysis. (Any 10 Mathematicians)</p>

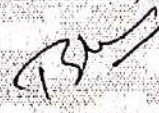

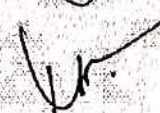
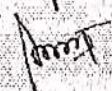

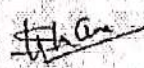
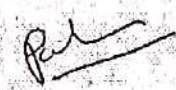
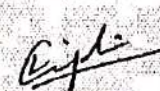
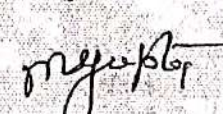

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Part C - Learning Resource		
Text Books, Reference Books, Other Resources		
Part D: Assessment and Evaluation		
Suggested Continuous Evaluation Methods:		
Maximum Marks: 50		
Continuous Comprehensive Evaluation (CCE): Not Applicable		
University Exam(UE): 50 Marks		
Internal Assessment:		
Continuous Comprehensive Evaluation (CCE)	Class Test/Assignment/Presentation	Not Applicable

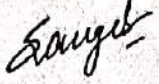

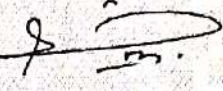
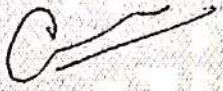

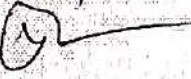
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Part A: Introduction			
Program: Diploma Course		Class: B. A / B.Sc. Part II	Year: 2022 Session: 2023-2024
1	Course Code	Paper – MATH-3T	
2	Course Title	Differential Equations	
3	Course Type	Theory	
4	Pre-requisite (if any)	No	
5	Course Learning Outcome (CLO)	<p>This Course will enable the students to:</p> <ul style="list-style-type: none"> • Understand the genesis of ordinary as well as partial differential equations. • Learn various techniques of getting exact solutions of certain solvable first order differential equations and linear differential equations of second order. • Know Picard's method of obtaining successive approximations of solutions of first order ordinary differential equations, passing through a given point in the plane. • Learn about solution of first order linear partial differential equations using Lagrange's method. • Know how to solve second order linear partial differential equations with constant coefficients. • Formulate mathematical models in the form of ordinary and partial differential equations to problems arising in physical, chemical and biological disciplines. 	
6	Credit Value	4	
7	Total Marks	Maximum Marks : 50	Minimum Passing Marks :

Part B: Content of the Course		
Total Periods: 60		
Unit	Topics	No. of Periods
I	First Order Differential Equations: Basic concepts and genesis of ordinary differential equations, Order and degree of a differential equation, Differential equations of first order and first degree, Equations in which variables are separable, Homogeneous equations, Linear differential equations and equations reducible to linear form, Exact differential equations, Integrating factor, First order higher degree equations solvable for x , y and p , Clairaut's form and singular solutions; Picard's	12

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 सत्यनन्द मंडल
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 विश्वविद्यालय, रायगढ़ (छ.ग.)

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	method of successive approximations and the statement of Picard's theorem for the existence and uniqueness of the solutions of the first order differential equations.	
II	Second Order Linear Differential Equations: Statement of existence and uniqueness theorem for the solution of linear differential equations, General theory of linear differential equations of second order with variable coefficients, Solutions of homogeneous linear ordinary differential equations of second order with constant coefficients, Method of variation of parameters and method of undetermined coefficients, Reduction of order, Euler-Cauchy equations, Coupled linear differential equations with constant coefficients.	12
III	First Order Partial Differential Equations: Genesis of Partial differential equations (PDE), Concept of linear and non-linear PDEs, Methods of solution of Simultaneous differential equations of the form: $dx/P(x,y,z) = dy/Q(x,y,z) = dz/R(x,y,z)$, Lagrange's method for PDEs of the form: $P(x,y,z)p + Q(x,y,z)q = R(x,y,z)$, where $p = \partial z / \partial x$ and $q = \partial z / \partial y$; Solutions passing through a given curve.	12
IV	Second order Partial differential equations: Principle of superposition for homogeneous linear PDEs, Relation between solution sets of non-homogeneous linear PDEs and their corresponding homogeneous equations, Reducible and irreducible homogeneous equations and their solutions in various possible cases, Solution of non-homogeneous reducible equations using Lagrange's method for first order equations.	12
V	Applications: Orthogonal trajectories of one-parameter families of curves in a plane, Minimum velocity of escape from Earth's gravitational field, Newton's law of cooling, Malthusian and logistic population models, Radioactive decay, Free and forced mechanical oscillations of a spring suspended vertically carrying a mass at its lowest tip, Phenomena of resonance, LCR circuits, Surfaces orthogonal to a given system of surfaces.	12

Part C - Learning Resource

Text Books and Reference Books:

1. Erwin Kreyszig . *Advanced Engineering Mathematics* (10th edition). J. Wiley & Sons 2011
2. B. Rai & D. P. Choudhury. *Ordinary Differential Equations - An Introduction*. Narosa Publishing House Pvt. Ltd. New Delhi. 2006
3. Shepley L. Ross. *Differential Equations* (3rd edition). Wiley. 2007
4. George F. Simmons. *Differential Equations with Applications and Historical Notes* (3rd edition). CRC Press. Taylor & Francis. 2017

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अध्यक्ष निदेश
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निदेशालय, रायपुर (उ.प्र.)

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5. Ian N. Sneddon. *Elements of Partial Differential Equations*. Dover Publications. 2006

E-Resources:

1. Suggested Equivalent online courses: Web link NPTEL/ SWAYAM/ MOOCs
2. Differential equation
<https://www.youtube.com/watch?v=NBcGLLU90fM&list=PLbMVogVj5nJSGlf9sluucwobyzz6glD>
3. Partial Differential equation
<https://www.youtube.com/watch?v=Kk5SEzASKZU&list=PL9m2Lkh6odgKbfY03TFRhwjOqW79UdzK8>

Part D: Assessment and Evaluation

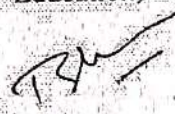
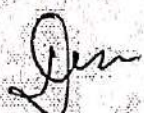


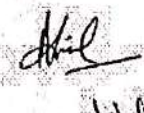
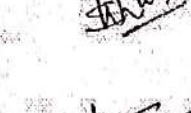
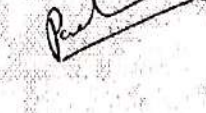
Suggested Continuous Evaluation Methods:

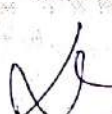
Maximum Marks:

50 Marks

Declaration

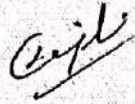
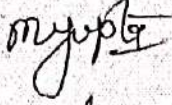
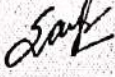

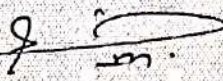


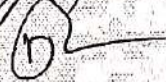
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8. Dr. Anjali Chandravanshi
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विश्वविद्यालय, रायपुर (छ.ग.)



Part A: Introduction			
Program: Diploma Course	Class: B. A. / B.Sc. Part II	Year: 2022	Session: 2023-2024
1	Course Code	Paper – MATH-4T	
2	Course Title	Real Analysis	
3	Course Type	Theory	
4	Pre-requisite (if any)	No	
5	Course Learning Outcome (CLO)	<p>This Course will enable the students to:</p> <ul style="list-style-type: none"> • Understand basic properties of real number system such as least upper bound property and order property. • Realize importance of bounded, convergent, Cauchy and monotonic sequences of real numbers, find their limit superior and limit inferior. • Apply various tests to determine convergence and absolute convergence of a series of real numbers. • Learn about Riemann integrability of bounded functions and algebra of R-integrable functions. • Determine various applications of the fundamental theorem of integral calculus. • Relate concepts of uniform continuity, differentiation, integration and uniform convergence. 	
6	Credit Value	4	
7	Total Marks	Maximum Marks : 50	Minimum Passing Marks :

Part B: Content of the Course		
Total Periods: 60		
Unit	Topics	No. of Periods
I	Real Numbers: The set of real numbers \mathbb{R} as an ordered field, Least upper bound properties of \mathbb{R} , Metric property and completeness of \mathbb{R} , Archimedean property of \mathbb{R} , Dense subsets of \mathbb{R} , Nested intervals property; Neighbourhood of a point in \mathbb{R} , Open sets, limit point of a set, closed and perfect sets in \mathbb{R} , connected and compact subsets of \mathbb{R} , Heine-Borel theorem.	12
II	Convergence of Sequences in \mathbb{R}: Bounded and monotonic sequences, Convergent sequence and its limit, Limit theorems, Monotone convergence	12

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 विश्वविद्यालय, रायचूर (उ.प्र.)

	theorem, Subsequences, Bolzano-Weierstrass theorem, Limit superior and limit inferior, Cauchy sequence, Cauchy's convergence criterion.	
III	Infinite Series: Convergence of a series of positive real numbers, Necessary condition for convergence, Cauchy criterion for convergence; Tests for convergence: Comparison test, Limit comparison test, D'Alembert's ratio test, Cauchy's n^{th} root test, Abel's test, Integral test; Alternating series, Absolute and conditional convergence, Leibniz theorem, Rearrangements of series, Riemann's rearrangement theorem.	12
IV	Riemann Integration: Riemann integrability of bounded functions, Examples of R-integrable and non-integrable functions, Algebra of Riemann integrable functions, Integrability of continuous and monotonic functions, Darboux theorems, Fundamental theorem of integral calculus, First mean value theorem and second mean value theorems (Bonnet and Weierstrass forms). Necessary and sufficient condition for Riemann integrable function (Statement only).	12
V	Uniform Convergence, Continuity and Improper Integrals: Pointwise and uniform convergence of sequence and series of functions, Uniform continuity, Weierstrass's M-test, Uniform convergence and continuity, Uniform convergence and differentiability, Improper integrals and tests for improper integrals, Beta and Gamma functions.	12

Part C - Learning Resource

Text Books, Reference Books:

1. T. M. Apostol. *Mathematical Analysis: A Modern Approach to Advanced Calculus*. Pearson Education. 2008
2. Charalambos D. Aliprantis & Owen Burkinshaw. *Principles of Real Analysis* (3rd edition). Academic Press. 1998
3. Robert G. Bartle & Donald R. Sherbert. *Introduction to Real Analysis* (4th edition). Wiley India. 2015
4. Gerald G. Bilodeau, Paul R. Thie & G. E. Keough. *An Introduction to Analysis* (2nd edition), Jones and Bartlett India Pvt. Ltd. 2015
5. E. Hewitt & K. Stromberg (2013). *Real and Abstract Analysis*. Springer-Verlag.
6. K. A. Ross. *Elementary Analysis: The Theory of Calculus* (2nd edition). Springer. 2013

अध्यक्ष
अध्यक्ष मंडल
शशिदत्त मंदकुमार पटेल
विद्यालय, रामगढ़ (छ.ग.)

7 Walter Rudin. *Principles of Mathematical Analysis* (3rd edition), Tata McGraw Hill.

E-Resources:

1. Suggested Equivalent online courses: Web link NPTEL/ SWAYAM/ MOOCs
2. <https://www.youtube.com/watch?v=Bef8QjijCy0&list=PLbMVogVj5nJQ1UXrOm7KqTg9UKk6eXRp>
3. https://www.youtube.com/watch?v=C2qloHkhEuM&list=PL0zRYVm0a65cpVtcdj_5SBEh6VQvC_BvR

Part D: Assessment and Evaluation

Suggested Continuous Evaluation Methods:
Maximum Marks:

50 Marks

Declaration

This is to certify that the syllabus is framed by the Central Board of Studies (Mathematics) as per the guidelines (TOR) of the Department of Higher Education, Raipur Chhattisgarh.

1. Dr. Premlata Verma
Asst. Prof.
Govt. Bilasa Girls PG College, Bilaspur
2. Prof. R.R. Sahu
Asst. Prof.
Govt. MMR PG College, Champa
3. Mr. Yetendra Upadhyay
Asst. Prof.
Govt. N.K. College, Kōtā
4. Ram Laxhan Pandey
Asst. Prof.
Dr. B.R. Ambedkar Govt. College, Baloda
5. Dr. Arun Kumar Mishra
Professor
Govt. DT PG College, Utai
6. Dr. Shabnam Khan
Professor
Govt. Digvijay PG College, Rajnandgaon
7. Dr. Padmavati
Professor
Govt. VYT PG Auto. College, Durg

Chairman

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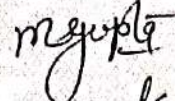
अध्यक्ष
अध्ययन मंडल
शशिद संदेकुमार पटेल
(स. म.)

8. Dr. Anjali Chandravanshi
Asst. Prof.
Govt. J.Y. Chhattisgarh College, Raipur
9. Manisha Gupta
Asst. Prof.
GNA Govt. PG College, Bhatapara, Raipur
10. Mrs. Sangeeta Pandey
Asst. Prof.
R.G. Govt. PG College, Ambikapur
11. Dr. S.K. Bohre
Asst. Prof.
I.G. Govt. PG College, Vaishalinagar, Bilai
12. Dr. Samir Dashputre
Asst. Prof.
Govt. College, Arjunda, Balod
13. Dr. Chandrajeet Singh Rathore
Asst. Prof.
Govt. Jajwalyadev Naveen Girls PG College, Janjgir
14. Dr. Shri Nath Gupta
K. Govt. Arts & Science College, Raigarh
15. Dr. Raghu Nandan Patel
Asst. Prof.
Govt. MLS College, Seepat

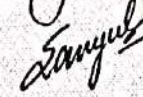
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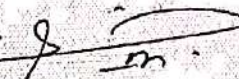
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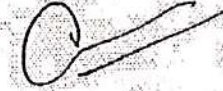
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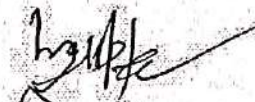
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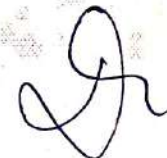
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श. वि. नंदकुमार पटेल
विश्वविद्यालय, रायगढ़ (छ.ग.)



Scheme of B. Sc./ B.Sc. (Hons.) Microbiology

Year	Course Code	Subject Name	Theory/ Practical/Project	Total Credit	Total Marks	
					Max	Min
Second year	MICRO -3T	Cell Biology, Biochemistry and Bioinstrumentation	Theory	4	50	17
	MICRO -4T	Microbial Genetics, Molecular Biology & Genetic Engineering	Theory	4	50	17
	MICRO -2P	LAB.2: Bacterial cell, Biochemistry & Molecular Biology	Practical	2	50	17

Note: There shall be four extra credits in each year for internship/apprenticeship. The certificate of extra credits for this would be provided by the concern University and is not mandatory.

Signature

Signature
अध्यक्ष

आचार्य मंडल
शहीद नंदकुमार पटेल
विश्वविद्यालय, रायगढ़ (उ.प्र.)

Part A: Introduction			
Program: <i>Diploma Course</i>		Class: <i>B. Sc. Part - II</i>	Year: <i>2023</i> Session: <i>2023-2024</i>
1	Course Code	MICRO - 2P	
2	Course Title	Bacterial cell, Biochemistry & Molecular Biology	
3	Course Type	Laboratory course	
4	Pre-requisite (if, any)	As per Govt. norms	
5	Course Learning Outcomes (CLO)	At the end of this course, the students will be able to <ul style="list-style-type: none"> - understand the microscopy, cytometry and relevant biochemical techniques - handle the instruments / equipments applied for biochemical & molecular experiments - perform the exercise / experiments of molecular biology 	
6	Credit Value	02	
7	Total Marks	Max. Marks: 50	Min Passing Marks : 17

PART B: Content of the Course

Total No. of Teaching Hours - 20 / Periods -30		
L. C.	Topics (Course contents)	No. of Period/Hours
A	1. Study of cell morphology – Prokaryotic & Eukaryotic cell 2. Study of cell division stages using Onion root tip. 3. Determination of antibiotic resistance by plating method. 4. Assaying of microbial enzymes; Catalase, Amylase 5. Separation of mixtures by paper / thin layer chromatography. 6. Demonstration of column packing in any form of column chromatography. 7. Separation of protein mixtures by any form of chromatography. 8. Determination of pH of various water and soil sample. 9. Testing of Lambert beer's law. 9. Production of any metabolite using batch fermentation.	15 / 10
B	1. Isolation of genomic DNA from <i>E. coli</i> 2. Isolation of DNA from plant cell (Onion/Mustard/Banana) 3. Transformation of <i>E. coli</i> – Preparation of competent cell 4. Conjugation in <i>E. coli</i> using plate method 5. Estimation of RNA using colorimeter or UV spectrophotometer 6. Resolution and visualization of DNA by Agarose Gel Electrophoresis. 7. Study survival curve of bacteria after exposure to ultraviolet (UV) light 8. Isolation of Plasmid DNA from <i>E. coli</i> 9. Separation of protein mixtures by Polyacrylamide Gel Electrophoresis (PAGE)	15 / 10

Keywords *Biochemical techniques, Chromatography, DNA isolation, RNA estimation, Plasmid*

PART - C

Learning Resources: Text Books, Reference Books and Others

Suggested Readings:

Text Books Recommended –

- Aneja K. R., Laboratory Manual Of Microbiology And Biotechnology, Medtech; 1st edition, 2017
- Text books and Laboratory manuals as mentioned in MICRO – 3T and 4T

Online Resources –

- <https://thebookee.net/>
- <http://site.iugaza.edu.ps/mwhindi/files/Laboratory Manual And Workbook In Microbiology.pdf>
- <http://site.iugaza.edu.ps/ydahdouh/files/General-Microbiology-Laboratory-pdf.pdf>

DWAN

[Signature]

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 शहीद नंदकुमार पटेल
 विद्यालय, रायगढ़ (ग.ग.)

Part D: Assessment and Evaluation		
Suggested Continuous Evaluation Methods:		
Maximum Marks:		50 Marks
Continuous Comprehensive Evaluation (CCE):		NA
Annual /University Exam(UE):		50 Marks
Internal Assessment:		
Continuous Comprehensive Evaluation (CCE)	Class Test/Assignment /Field work	NA

Pholl

Dr. Rachana Choudhary
Subject Expert
H.O.D. Microbiology
S.S.M.V. Junwari, Bिला

Dr. DK. Shrivastava
Member
HOD, Microbiology
Govt. P.G. Sc. College,
Bilaspur

Shrij

Dr. Shubhraj Pandey
Chairperson
Nominating
HOD, Microbiology
D.P. Vepra College
Bilaspur (C.G.)

Rashmi

Dr. Rashmi Parihar
Subject expert
Dept. of Microbiology
Govt. P.G. Science
College, Bilaspur.

Richa

Dr. Richa Mishra
Member
H.O.D. Microbiology
APSCMNS Govt. P.G. College
Kawardha (C.G.)

Dr. Anil Kumar Patel

Dr. Anil Kumar Patel
Govt. P.G. College (C.G.)
Bilaspur
Jaghpur

Seema

Dr. Seema Anil Beloskar
Microbiology & Bioinformatics
ABVV, Bilaspur.

Swati

Dr. Swati Khatwani
CBOS chairperson
Head Microbiology
VTD ASVA, Bilaspur

Sadhana

Dr. Sadhana Jaiswal
(Member)
Govt. Nagarjuna P.G.
College of Science, Raipur

Swati

Dr. Swati Anand Nagarkar
HOD Microbiology
Govt. M.K. L. Mahasamund
College, Bilaspur

Part - A: Introduction			
Program: <i>Diploma Course</i>		Class: B. Sc. Part - II	Year: 2023 Session: 2023-2024
1	Course Code	MICRO -3T	
2	Course Title	Cell biology, Biochemistry and Bioinstrumentation	
3	Course Type	Core course	
4	Pre-requisite (if, any)	As per Government norms	
5	Course Learning Outcomes (CLO)	At the end of this course, the students will be able to -- <ul style="list-style-type: none"> • - clarify the basic concept of feature, types, function and importance of living cell as a structural & functional unit of living body • - get acquaintance of the knowledge about biochemical reactions and cellular mechanism to provide bio energy for living activities • - know about basic principle, procedure and application of various instruments and techniques to explore the biological system • - exercise the various experiments and perform fundamental biological techniques operating the concern instruments 	
6	Credit Value	04	
7	Total Marks	Max. Marks: 50	Min Passing Marks: 17

PART B: Content of the Course

Total No. of Teaching Hours – 40 / Periods - 60		
Unit	Topics (Course contents)	No. of Period / Hour
I	Structure and organization of Cell Cell Organization –Plant and animal cells: Plasma membrane: Structure and functions, Cell Wall: Eukaryotic cell wall. Cell-Cell Interactions - adhesion junctions, tight junctions, gap junctions, and plasmodesmata (only structural aspects). Mitochondria, endoplasmic reticulum, Golgibody, Ribosomes, Lysosomes, Chloroplasts and Peroxisomes.	12 / 08
II	Biomolecules - Structure, classification, function and properties Carbohydrates Monosaccharide, Oligosaccharides (Disaccharides) and Polysaccharides. Protein - Amino acids, peptides and Proteins structural organisation. Lipids Saturated and unsaturated.	12 / 08
III	Metabolism Glycolysis, TCA cycle and Oxidative Phosphorylation. Anaerobic catabolism of glucose; Fat Biosynthesis, alpha and beta oxidation of fatty acids, Decarboxylation, Deamination, trans-amination and Urea cycle.	12 / 08

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 Dr. Anand Kumar Patel
 Head of Department, Raigarh (C.G.)

IV	Bioinstrumentation - I: Principle, Instrumentation and applications pH Meter, Microscopy (Light compound, Phase-contrast microscope & Electron microscope), Colorimeter, Spectrophotometer, Turbidometer, Centrifuge - differential & density gradient centrifugation techniques	12 / 08
V	Bioinstrumentation –II: Principle, Instrumentation and applications Electrophoresis - types, Gel electrophoresis, Chromatography - Paper Chromatography, Thin Layer Chromatography, Column Chromatography Ion Exchange Chromatography, High Pressure Liquid Chromatography and Gas Chromatography	12 / 08
Keywords <i>cell biology, bio-molecules, metabolism, bioinstrumentation</i>		

PART - C

Learning Resources: Text Books, Reference Books and Others

Suggested Readings:

Text Books Recommended -

1. Watson JD, Baker TA, Bell SP, Gann A, Levine M and Losick R (2008) Molecular Biology of the
2. De Robertis EDP and De Robertis EMF (2006) Cell and Molecular Biology, 8th edition. Lippincott
3. Williams and Wilkins, Philadelphia
4. Karp G (2010) Cell and Molecular Biology: Concepts and Experiments, 6th edition, John Wiley & Sons. Inc.
5. Sambrook J and Russell DW. (2001). Molecular Cloning: A Laboratory Manual. 4th Edition, ColdSpring Harbour Laboratory press.
6. Krebs J, Goldstein E, Kilpatrick S (2013). Lewin's Essential Genes, 3rd Ed., Jones and Bartlett Learning
7. Wiley JM, Sherwood LM and Woolverton CJ. (2008). Prescott, Harley and Klein's Microbiology. McGraw Hill Higher Education
8. Wilson K and Walker J. (2010). Principles and Techniques of Biochemistry and Molecular Biology. 7th Ed.. Cambridge University Press.
9. Nelson DL and Cox MM. (2008). Lehninger Principles of Biochemistry, 5th Ed., W.H. Freeman and Company.

Online Resources –

➤ e-Resources / e-books and e-learning portals

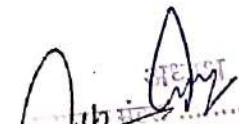
➤ Use of following sites


1. <https://nptel.ac.in/courses/102103015>
2. https://onlinecourses.swayam2.ac.in/cec19_bt11/preview
3. <https://www.britannica.com>


CONCUM

अध्यक्ष
 सचिव मंडल
 शाहीद नरसिंह पटेल
 विश्वविद्यालय, रायगढ़ (उ.प्र.)


Part D: Assessment and Evaluation		
Suggested Continuous Evaluation Methods:		
Maximum Marks:		50 Marks
Continuous Comprehensive Evaluation (CCE):		NA
Annual /University Exam(UE):		50 Marks
Internal Assessment:		
Continuous Comprehensive Evaluation (CCE)	Class Test/Assignment /Field work	NA

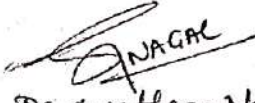

 DR. K.K. Patal
 Govt. T.C.I. P.G. College,
 Jangra


 Dr. Rachana Choudhary
 Subject Expert
 H.O.D. Microbiology
 S.S. M.V. Junwani, Bhilai



 Dr. Dr. Smirabhar
 Member
 HOD Microbiology
 Govt. R.P.G. So.
 College, Bilaspur


Ladhana
 Dr. Ladhana Jainwal
 (Member)
 HOD - Microbiology
 Govt. N.P.G. College of
 Science, Raipur

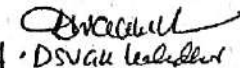

 Dr. Richa Mishra
 Member
 H.O.D. Microbiology
 APSAMNS Govt P.G.
 College, Kamodha (C.G.)


 Dr. Svetlana Nagal
 HOD Microbiology
 Govt. M.K.G.C
 Mahasamund.

Rashmi
 Dr. Rashmi Parihar
 Subject expert
 Dept. of microbiology
 Govt. E.R.R. P.G. Science
 College, Bilaspur.


 Dr. Shubrajit Panckaj
 Chancellor Nominated
 Chairperson
 HOD, Microbiology
 D. P. Vipra College
 Bilaspur (C.G.)


 Dr. Seema Belorkar
 Subject-Expert-
 MBBT, ABVV
 Bilaspur.


 Prof. DSV
 CBES chairperson
 Head Microbiology
 LTD, ABVV, Bilaspur

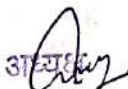
Part - A: Introduction			
Program: <i>Diploma Course</i>		Class: B. Sc. Part - II	Year: 2023 Session: 2023-2024
1	Course Code	MICRO - 4T	
2	Course Title	Microbial Genetics, Molecular Biology & Genetic Engineering	
3	Course Type	Core course	
4	Pre-requisite (if, any)	As per Government norms	
5	Course Learning Outcomes (CLO)	At the end of this course, the students will be able to -- <ul style="list-style-type: none"> • - clarify the basic concept of Genetics, Microbial genetics, mode of recombination microbes as basis of sexuality in living beings • - get acquaintance of the knowledge about the Gene expression & regulation with concept of central dogma of Molecular biology • - know about basic principle, procedure and application of Recombinant DNA Technology 	
6	Credit Value	04	
7	Total Marks	Max. Marks: 50	Min Passing Marks: 17

PART B: Content of the Course

Total No. of Teaching Hours – 40 / Periods – 60


Unit	Topics (Course contents)	No. of Period / Hour
I	Microbial Genetics: Mechanisms of Genetic Exchange Transformation, Conjugation and Transduction. Types of plasmids – F plasmid, R Plasmids, colicinogenic plasmids, Ti plasmids, linear plasmids. Plasmid replication and partitioning. Prokaryotic transposable elements – Insertion Sequences, Replicative and Non replicative transposition, composite and non-composite transposons, Mutations and mutagenesis.	12 / 08
II	Genetic material: Miescher to Watson and Crick- historic perspective, DNA structure, Types of DNA, Organization of DNA Prokaryotes, Viruses, and Eukaryotes. RNA Structure, Organelle DNA-mitochondria and chloroplast DNA. Replication of DNA (Prokaryotes). DNA Repair system and its types.	12 / 08
III	Fundamentals of Molecular genetics: Central dogma of Molecular biology. Transcription, Translation in Prokaryotes, Post Translational Processing. Regulation of gene Expression in Prokaryotes. Principles of transcriptional regulation, regulation at initiation with examples from lac- and trp- operons.	12 / 08

Signature


 आशु
 प्राध्यापन मंडल
 राष्ट्रीय नंदकुमार पटेल
 विद्यालय, रायगढ़ (छ.प्र.)

IV	Introduction to Genetic Engineering: Molecular Cloning- Tools; Restriction modification systems: Types I, II and III. Mode of action, nomenclature, DNA modifying enzymes and their applications. Cloning Vectors: Definition and Properties Plasmid vectors: pBR and pUC series. Bacteriophage lambda and M13 based vectors. Cosmids, BACs, YACs. Expression vectors: E.coli lac and T7 promoter-based vectors, SV40-based expression vectors.	12 / 08
V	Molecular Cloning and Transformation: Methods in Molecular Cloning and Transformation of DNA: Chemical method, Electroporation, Gene delivery: Microinjection, electroporation, DNA, RNA and Protein analysis: Agarose gel electrophoresis, Southern - and Northern - blotting techniques, dot blot, DNA microarray analysis, SDS-PAGE and Western blotting. Applications of Recombinant DNA Technology	12 / 08
Keywords <i>Genetics, Microbial genetics, Nucleic acid, Central dogma, Gene, Gene expression</i>		
PART - C		
Learning Resources: Text Books, Reference Books and Others		
Suggested Readings:		
<p style="text-align: center;"><i>Text Books Recommended -</i></p>		
<ol style="list-style-type: none"> 1. Genetics by P. K. Gupta, Rastogi Publication, New Delhi 2. Watson JD, Baker TA, Bell SP, Gann A, Levine M and Losick R (2008) Molecular Biology 3. De Robertis EDP and De Robertis EMF (2006) Cell and Molecular Biology, 8th edition. Lippincott 4. Karp G (2010) Cell and Molecular Biology: Concepts and Experiments, 6th edition, John Wiley & Sons. 5. Sambrook J and Russell DW. (2001). Molecular Cloning: A Laboratory Manual. 4th Edition, Cold Spring Harbour Laboratory press. 6. Wiley JM, Sherwood LM and Woolverton CJ. (2008). Prescott, Harley and Klein's Microbiology McGraw Hill Higher Education 7. Wilson K and Walker J. (2010). Principles and Techniques of Biochemistry and Molecular Biology. 7th Ed., Cambridge University Press. 8. Nelson DL and Cox MM. (2008). Lehninger Principles of Biochemistry, 5th Ed., W.H. Freeman and Company. 		
Online Resources –		
<ul style="list-style-type: none"> ➤ e-Resources / e-books and e-learning portals ➤ Use of following sites <ol style="list-style-type: none"> 1. https://nptel.ac.in/courses/102103015 2. https://onlinecourses.swayam2.ac.in/cec19_bt11/preview 3. https://www.britannica.com 		

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राजेश
अध्यक्ष पंजीत
नंदकुमार पटेल
रायगढ़ (छ.ग.)

Part D: Assessment and Evaluation		
Suggested Continuous Evaluation Methods:		
Maximum Marks:	50 Marks	
Continuous Comprehensive Evaluation (CCE):	NA	
Annual /University Exam(UE):	50 Marks	
Internal Assessment:		
Continuous Comprehensive Evaluation (CCE)	Class Test/Assignment /Field work	NA

Phol
 Dr. Rachana Choudhary
 Subject Expert
 H.O.D. Microbiology
 S.S.M.V. Junwani

Dr. D. K. Shrivastava
 Member
 HOD, Microbiology
 Govt. E.R.R. PG.Sc. College
 Parla (C.C.G.)

Rashmi
 Dr. Rashmi Parihar
 member, Subject expert
 Dept. of microbiology
 Govt. E.R.R. PG.Sc. college
 Bilaspur (C.C.G.)

Dr. Scema. A. Belaskar
 Member, Subject Expert,
 Dept. of Microbiology & Bioinformatics,
 Atal Bihari Vajpayee University,
 Bilaspur.

Dr. Shubhraj Pandey
 Member
 HOD, Microbiology
 D.P.Vipra College
 Bilaspur

DR. K.K. Patel
 Member
 Head Dept of Microbiology
 Govt. T.C.L.P.G. College
 Jangam (C.C.G.)

Dr. Sadhana Jainwal
 Member-Subject expert
 HOD - Microbiology
 Govt. N.P.G. college of
 Science, Raipur

Dr. Richa Mishra
 member
 HOD, Microbiology
 APSGMS Govt. P.G.
 College Kawardha

DR. SWETHANA NAGAL
 DR. Swethana Nagal
 HOD Microbiology
 Govt. M.K.G. College
 Mahasamund.

Dr. Anjali
 Prof. Dr. Anjali
 Chos. chairperson
 Head, Microbiology & Biotechnology,
 UTD ASVU, Bhopal

Scheme of B. Sc. Physics

Year	Course Code	Subject Name	Theory/ Practical	Total Credit	Total Marks	
					Max	Min
Second year	PHY-3T	Thermal Physics and Statistical Mechanics	Theory	4	50	17
	PHY-4T	Waves and Optics	Theory	4	50	17
	PHY-2P	LAB 2: Thermal Physics, Statistical Mechanics, Waves and Optics	Practical	2	50	17

Note: There shall be four extra credits in all the years of under graduation for internship/apprenticeship. The certificate of extra credits would be provided by the university concern.

(Signature)


Dr. Ak. Panigrahi
 27.6.23
 अध्यक्ष
 अध्ययन मंडल
 राष्ट्रीय विद्युत्तान परिसर
 विश्वविद्यालय, रायपुर (छ.ग.)

Part A: Introduction			
Program: Practical Course		Class: B.Se.	Year: Second
		Session: 2022-2023 2024-25	
1	Course Code	PHY - 2P	
2	Course Title	LAB 2: Thermal Physics, Statistical Mechanics, Waves and Optics	
3	Course Type	Practical	
4	Pre-requisite (if any)	No	
5	Course Learning Outcomes (CLO)	Expected Outcomes: - <ul style="list-style-type: none"> • Students able to get working knowledge of laws and methods of thermodynamics and elementary statistical mechanics and to use this knowledge students can explore various application related to physics of condensed matter. • Students experience experimental evidence of laws of wave optics and how light has wave nature is confirmed through experiment. 	
6	Credit Value	2	
7	Total Marks	Max. Marks: 50	Min Passing Marks : 17

Part B: Content of the Course

Total Lectures: 30

Tentative Practical List	Any 14 practical from the following
	<ol style="list-style-type: none"> 1. To determine the thermal conductivity of a non-conducting material by Lee's disc method. 2. To determine the specific rotation of sugar solution with the help of polarimeter. 3. To verify Newton's law of cooling. 4. To study binomial distribution law of probability using 4 coins. 5. To determine the frequency of electric generator by Melde's experiment. 6. To determine the coefficient of thermal conductivity(k) by rubber tubing method. 7. To study the heat efficiency of an electric kettle with varying voltage. 8. To determine the frequency of A.C. mains using sonometer. 9. To determine the ratio of specific heat at constant pressure and constant volume ($\gamma=C_p/C_v$) of air Clement and Desorme's method. 10. To study the variation of thermos-Emf of thermos couple with Difference of Temperature of its Two Junctions. 11. To determine the refractive index of the material of the prism with the help of spectrometer. 12. To determine the radius of curvature of a plano-convex lens by Newton's circular ring method. 13. To find out wavelength of monochromatic light source with the help of Newton's Ring. 14. To determine the wavelength of laser light by diffraction grating. 15. To determine the resolving power of a telescope. 16. To determine the resolving power of a plane diffraction grating. 17. To determine the wavelength of monochromatic light source by


 Dr. G. S. Rao
 27/6/2024
 Head of the Department
 P. V. N. S. Rao
 P. V. N. S. Rao (U.S.)


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single slit diffraction.

18. To determine the dispersive power of the prism with the help of spectrometer.
19. To determine the refractive index of ordinary and extra-ordinary rays for the calcite prism using spectrometer.
20. To determine the refractive index of water using laser light and photocell.

Part C - Learning Resource

Text Books, Reference Books, Other Resources

Reference Books:

1. Advanced Practical Physics for students, B.L.Flint & H.T.Worsnop, 1971, AsiaPublishing House.
2. Advanced level Physics Practicals, Michael Nelson and Jon M. Ogborn, 4th Edition, reprinted 1985, Heinemann Educational Publishers
3. A Text Book of Practical Physics, Indu Prakash and Ramakrishna, 11th Edition, 2011, Kitab Mahal, New Delhi.
4. A Laboratory Manual of Physics for Undergraduate Classes, D.P. Khandelwal, 1985, Vani Publication.

Part D: Assessment and Evaluation

Suggested Continuous Evaluation Methods:

Maximum Marks: 50

Continuous Comprehensive Evaluation (CCE): As per University Guideline

University Exam(UE): 50 Marks

Internal Assessment:

Continuous Comprehensive Evaluation(CCE)

Class Test/Assignment/Prese
ntation

As per University
Guideline


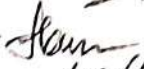
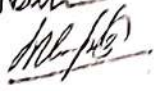

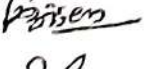

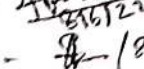
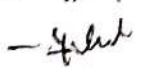

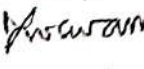

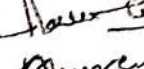
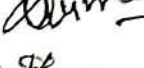
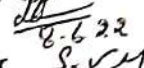
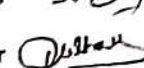


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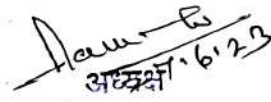
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शहीद नंदकुमार परिये
विश्वविद्यालय, रायगढ़ (छ.ग.)

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DECLARATION

This is to certify that the syllabus is framed by the Central Board of studies (Physics) as per the guidelines (TOR) of The Department of Higher Education, Raipur, Chhattisgarh

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| 02/ Dr. Jagjeet Kaur Saluja, Govt. V Y T P.G. College, Durg | - Member |  |
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| 13/ Dr. Anil Kumar Panigrahi, Kirodimal Govt. Arts/Science College, Raigarh | - Member |  |
| 14/ Dr. Ugendra Kumar Kurrey, Govt.C.L.C Arts & Science College, Patan, Durg, | - Member |  |
| 15/ Dr.Dipti Jha , Dr. Radhabai Govt. Navin Kanya Mahavidyalya, Raipur, | - Member |  |
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| 17/ Dr. Vikas Gulhare, Govt. G.N.A. P.G. College, Bhatapara | - Member |  |


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अध्यक्ष मंडल
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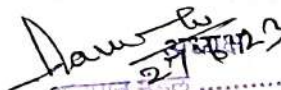
Part A: Introduction


Program: Diploma		Class: B.Sc.	Year: Second	Session: 2022-2023 2024-25
1	Course Code	PHY - 3T		
2	Course Title	THERMAL PHYSICS AND STATISTICAL MECHANICS		
3	Course Type	Theory		
4	Pre-requisite (if any)	No		
5	Course Learning Outcomes (CLO)	<p>After completion of the course students will be able to :</p> <ul style="list-style-type: none"> • Understand the relations between heat, work, temperature, and energy. • Understand how the thermal energy in a system change and perform useful work on its surroundings. • Understand the interrelationship between thermodynamic functions and ability to use such relationships to solve practical problems. • Get the understanding about black body radiation. • Get the introductory knowledge of statistical mechanics • Solve numerical problems based on entire syllabus 		
6	Credit Value	4		
7	Total Marks	Max. Marks: 50	Min Passing Marks: 17	

Part B: Content of the Course

Total number of Periods: 60

Unit	Topic	Number of Periods
I	<p>Laws of Thermodynamics:</p> <p>Thermodynamic Description of system: Zeroth Law of thermodynamics and temperature. First law and internal energy, conversion of heat into work, various Thermodynamical Processes, Work Done during Isothermal and Adiabatic Processes, Reversible & irreversible processes.</p> <p>Second law of thermodynamics & Entropy, Carnot's cycle, Carnot's theorem, Entropy changes in reversible & irreversible processes, Entropy-temperature diagrams, Third law of thermodynamics.</p>	12
II	<p>Thermodynamic Potentials: Internal Energy, Enthalpy, Helmholtz Free Energy and Gibbs function. Maxwell's relations & applications, Clausius- Clapeyron Equation, Expression for $(C_p - C_v)$, C_p/C_v, TdS equations, Thermodynamic energy equation- change in internal energy of an ideal and Vander Waal's gas, Joule-Thompson Effect, Cooling by adiabatic demagnetization</p>	12
III	<p>Kinetic Theory of Gases: Maxwellian distribution of speeds in an ideal gas: distribution of speeds and velocities, experimental verification, distinction between mean, rms and most probable speed values, Molecular Collision and Mean Free Path, Transport Phenomena in gases: Viscosity, Conduction and Diffusion, Law of equipartition of energy.</p>	12
IV	<p>Theory of Radiation: Blackbody radiation, Spectral distribution, Concept of Energy Density, Stefan Boltzmann Law, Newton's law of cooling from Stefan Boltzmann's law. Wien's displacement law and Rayleigh-Jeans Law (Only qualitative). Planck's radiation Law, Deduction of Wien's distribution law and Rayleigh- Jeans Law from Planck's law. Experimental verification</p>	12


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	of Planck's radiation law.	
V	Statistical Mechanics: Introductory Idea, Phase space, Macro-state and Microstate, Entropy and Thermodynamic probability, fundamental postulates of statistical mechanics. Boltzmann's Canonical Distribution Law. Maxwell-Boltzmann distribution law, Quantum statistics - Fermi-Dirac distribution law and its application for Fermi Levels and Fermi Energy, Bose-Einstein distribution law and its application for Liquid Helium, comparison of three statistics.	12

Part C - Learning Resource

Text Books, Reference Books, Other Resources

Reference Books:

1. Heat and Thermodynamics, M.W.Zemasky and R. Dittman. 1981, McGraw Hill
2. Heat and Thermodynamics, Enrico Fermi, 1956, Courier Dover Publications.
3. Heat and Thermodynamics: Singhal, Agrawal and Satya Prakash, Pragati Prakashan 1984
4. A Treatise on Heat, Meghnad Saha, and B.N. Srivastava, 1969, Indian Press.
5. Physics (Part-2): Editor, Prof. B.P.Chandra, M.P. Hindi Granth Academy
6. Thermodynamics, Kinetic theory & Statistical thermodynamics, F.W.Sears & G.L.Salinger. 1988, Narosa
7. Introduction to Statistical Mechanics: B.B.laud, New age International Publications Second Edition
8. Statistical Mechanics : R.K. Pathria and Paul D.Beale. ELSEVIER ,Fourth Edition,

Link for e-resources:

1. Basics of thermodynamics
<https://www.youtube.com/watch?v=9GMBpZZtiXM&list=PLD8E646B.AB3366BC8>
2. Thermodynamics <https://www.youtube.com/watch?v=E9cOAMhFUz0>
3. Second law of thermodynamics <https://www.youtube.com/watch?v=FfIGosPY8o>
4. Introduction of statistical mechanics
<https://www.youtube.com/watch?v=N7vkXugu3D0&list=PLZbgNdSTvWDYtZXp9DN9mGP1sNAjPNGgO>
5. Basic of statistical mechnics <https://www.youtube.com/watch?v=M4nvGS30b-s&list=PLuBpI7LKkMIGolbgdfvtzMTR214hdOv-r>
6. Classical Statistical Mechanics <https://youtu.be/XIXQ38JnF0k>
7. Bose-Einstein Statistics <https://youtu.be/1aHFG7VLR-g>

Part D: Assessment and Evaluation

Suggested Continuous Evaluation Methods:

Maximum Marks: 50

Continuous Comprehensive Evaluation (CCE): As per University Guideline

University Exam (UE): 50 Marks

Internal Assessment: Continuous Comprehensive Evaluation (CCE)	Class Test/Assignment/Prese ntation	As per University Guideline
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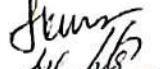
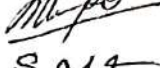
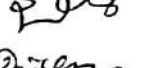


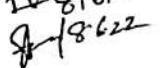


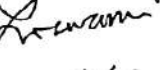
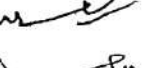
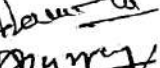

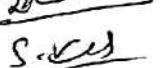
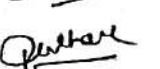


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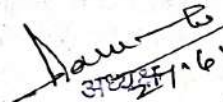
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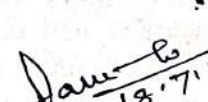
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DECLARATION

This is to certify that the syllabus is framed by the Central Board of studies (Physics) as per the guidelines (TOR) of The Department of Higher Education, Raipur, Chhattisgarh

- | | | |
|--|------------|---|
| 01/ Dr.S.K.Gupta, Govt. E.R.R. P.G Science College, Bilaspur | - Chairman |  |
| 02/ Dr. Jagjeet Kaur Saluja, Govt. V Y T P.G. College, Durg | - Member |  |
| 03/ Dr.Meera Gupta, Govt. Dr. W.W.Patankar Girls P.G. College, Durg, | - Member |  |
| 04/ Dr.S.J. Dhoble, R.T.M Nagpur University Nagpur | - Member |  |
| 05/ Dr.D.P.Bisen, Pt.R.S.U. Raipur | - Member |  |
| 06/ Dr.R.S. Kher, Principal, Govt.M.L.S. College Seepat | - Member |  |
| 07/ Dr. Anjali Oudhia, Govt. N.P.G. College of Science Raipur | - Member |  |
| 08/ Dr.Smriti Agrawal, Govt. College ,Vaishali nagar, bhilai | - Member |  |
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| 10/ Dr.Kamal K.Prasad Govt.N.E.S.College, Jaspur | - Member |  |
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	Diffraction Grating, Resolving Power of Grating.	
4	Polarization: Polarized light and its mathematical representation, Electromagnetic theory of double refraction, Nicol Prism, Double image prism, Polaroid, Phase retardation plates, Circular and elliptical polarization. Polarization by double refraction and Huygens's theory, Rotation of plane of polarization, Biquartz polarimeter.	12
5	LASER: Basic properties of LASERs, coherence length and coherence time, spatial coherence of a source, Einstein's A and B coefficients, Spontaneous and induced emissions, conditions for laser action, population inversion. Types of Laser: Ruby, He-Ne Laser and Semiconductor Laser. Application of Laser in communication and Holography.	12

Part C - Learning Resource

Text Books, Reference Books, Other Resources

Reference Books:

1. Fundamentals of Optics, F A Jenkins and H E White, 1976, McGraw-Hill
2. Principles of Optics, B.K. Mathur, 1995, Gopal Printing
3. Fundamentals of Optics, H.R. Gulati and D.R. Khanna, 1991, S. Chand Publication
4. University Physics. FW Sears, MW Zemansky and HD Young 13/e, 1986. Addison-Wesley
5. Physical Optics , A.K. Ghatak
6. Berkely Physics Course: Vol.-III, 'Waves and Oscillations'

Link for e-resources:

1. Wave an introduction <https://youtu.be/SuQE7eUErU>
2. Interference <https://youtu.be/hvpYKPyT-vc>
3. Diffraction <https://youtu.be/3RZZQvEVrEA>
4. Polarization https://youtu.be/nELYaf_N528
5. Laser and application <https://youtu.be/EK4yFAGHSFc>

Part D: Assessment and Evaluation

Suggested Continuous Evaluation Methods:

Maximum Marks: 50

Continuous Comprehensive Evaluation (CCE): As per University Guideline

University Exam(UE): 50 Marks

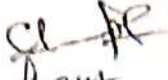
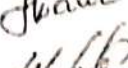

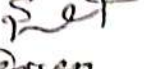
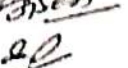

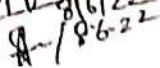
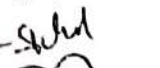

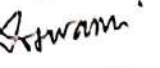
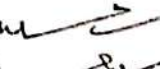
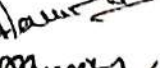
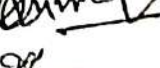
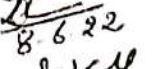
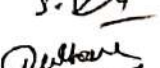


Internal Assessment: Continuous Comprehensive Evaluation (CCE)	Class Test/Assignment/Prese ntation	As per University Guideline
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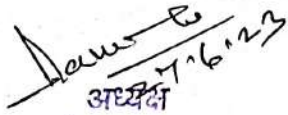
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अध्यक्ष 27.6.23
राज्य मंडल
शहीद नंदकुमार पटेल
विश्वविद्यालय, रायगढ़ (छ.ग.)

Signature
18.7.24

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| 03/ Dr.Meera Gupta, Govt. Dr. W.W.Patankar Girls P.G. College, Durg, | - Member |  |
| 04/ Dr.S.J. Dhoble, R.T.M Nagpur University Nagpur | - Member |  |
| 05/ Dr.D.P.Bisen, Pt.R.S.U. Raipur | - Member |  |
| 06/ Dr.R.S. Kher, Principal, Govt.M.L.S. College Seepat | - Member |  |
| 07/ Dr. Anjali Oudhla, Govt. N.P.G. College of Science Raipur | - Member |  |
| 08/ Dr.Smriti Agrawal, Govt. College ,Valshall nagar, bhilai | - Member |  |
| 09/ Dr.S.K.Shrivastava, Govt.P.G. College, Ambikapur | - Member |  |
| 10/ Dr.Kamal K.Prasad Govt.N.E.S.College, Jaspur | - Member |  |
| 11/ Dr. A.P.Goswami, Govt.Bilasa Girls P.G. College, Bilaspur | - Member |  |
| 12/ Dr. V.K. Dubey, Govt.N.P.G. Science College, Raipur | - Member |  |
| 13/ Dr. Anil Kumar Panigrahi, Kirodimal Govt. Arts/Science College, Raigarh | - Member |  |
| 14/ Dr. Ugendra Kumar Kurrey, Govt.C.L.C Arts & Science College, Patan, Durg, | - Member |  |
| 15/ Dr.Dipti Jha , Dr. Radhabal Govt. Navin Kanya Mahavidyalya, Raipur, | - Member |  |
| 16/ Dr.Shashi Kant Rathor,Dr. B.R. Ambedkar Govt.College,Baloda,Dist-Janjgir-Champa- | - Member |  |
| 17/ Dr. Vikas Gulhare, Govt. G.N.A. P.G. College, Bhathapara | - Member |  |


अध्यक्ष


संयोजक मंडल
शाहीद नंदकुमार पटेल
विश्वविद्यालय, रायगढ़ (छ.ग.)


18.7.24

**Scheme of B.Sc.
Zoology**

Year	Course Code	Subject Name	Theory/ Practical	Total Credit	Total Marks	
					Max	Min
			Practical	2	50	17
Second year	ZOOL-3T	Genetics , Developmental Biology and Evolution	Theory	4	50	17
	ZOOL-4T	Biochemistry and Molecular Biology	Theory	4	50	17
	ZOOL-2P	Practical	Practical	2	50	17

Note: There shall be four extra credits in all the years of under graduation for internship/apprenticeship. The certificate of extra credits would be provided by the university concern.


 27/6/23
 Dr. R. K. Jambhale
 प्राध्यापक, रायगढ़ (छ.ग.)
 विश्वविद्यालय, रायगढ़ (छ.ग.)

Part A: Introduction			
Program: Certificate Course		Class: B.Sc. II Year	Year: 2023 Session: 2023-2024
1	Course Code	ZOOL - 3T	
2	Course Title	Genetics, Developmental Biology & Evolution	
3	Course Type	Theory	
4	Pre-requisite (if any)	NO	
5	Course Outcome	<p>After successfully completing this course, the students will be able to:</p> <ul style="list-style-type: none"> Apply the principles of Mendelian inheritance on interaction of genes. Various methods of sex determination in animal kingdom. Understand the cause and effect of alterations in chromosome number and structure. Know the Recent Assisted Reproductive Techniques Develop critical understanding how a single-celled fertilized egg becomes an embryo and then a fully formed adult by going through three important processes of cell division, cell differentiation and morphogenesis. Understand the general patterns and sequential developmental stages during embryogenesis and understand how the developmental processes lead to establishment of body plan of multicellular organisms. Understand evolution through natural selection, and other forces. 	
6	Credit Value	Theory : 4	
7	Total Marks: 50	Max. Marks: 50	Min Passing Marks : 17

Part B : Content of Course		
Total No. of Periods : 60		
Unit	Topics	No. of Period
I	Concept of Genes and The recombination and interaction of Genes : Elements of heredity and variation - Classical and Modern concept of Gene (Cistron, muton, recon), Alleles. Mendel's laws of inheritance - Incomplete dominance, Codominance, Multiple alleles. Interaction of Genes - Lethal alleles, Pleiotropy, Epistasis, Supplementary Gene, Complementary genes, Polygenic inheritance. Linkage and crossing over, Linkage Map. Extra chromosomal and Maternal Inheritance. Sex Chromosomes and sex-linkage. Sex Determination	12
II	Regulation of Gene expression & Human Population Genetics : Gene Expressions and regulation - One gene-one enzyme hypothesis /one polypeptide hypothesis. Concept of Operon - Concept of Operon of bacteria and bacteriophages. Bacterial transposons. Transformation, transfection and transduction. Utility of the model organisms - <i>Escherichia coli</i> , & <i>Drosophila melanogaster</i> . Structural and numerical alterations of chromosomes - meiotic consequences in structural heterozygotes. Genetic disorders - Chromosomal Aneuploidy, Chromosome Translocation and Deletion, Single gene Disorders, Epigenetics, Pedigree analysis. Genetic counselling.	12

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18.7.24
Chairman

Studies
Nandkumar Patel
Miyalaya, Raigarh

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(Dr. Rakesh Tombole)
शरीर विज्ञान विभाग (रा.रा.)
राजस्थान विश्वविद्यालय, रायगढ़ (रा.रा.)

III	Developmental Biology : Gametogenesis, Structure of Gametes and Types of Eggs. Fertilization - external and internal. Structural and biochemical changes in gametes during and after fertilization block to polyspermy, causes of Infertility. Establishment of the major embryonic axis, polarity. Cleavage - Types and patterns. Body plan and symmetries. Development of frog and Chick up to formation of three germ layers. Tubulation. Morphogenesis, Fate maps. Organogenesis - formation of gut, heart, kidney and muscles. Inhibition, induction, and recruitment. Concept of competence, determination and differentiation and growth, Pleuropotency.	12
IV	Biology of development and Recent Techniques : Parthenogenesis. Regeneration - epimorphosis, morphallaxis and compensatory regeneration. Extra embryonic membranes. Amniocentesis. Placenta - Types structure and functions. Recent Assisted Reproductive Techniques (ART) – Stem cell (Types and their uses), Gene bank, Sperm Bank, Superovulation, Cryopreservation, Invitro fertilization (IVF), Embryo transfer (ET).	12
V	Evolution : Origin of Life on Earth, Early life on Earth - Indirect evidences & direct evidence of early life. Evidences of Organic evolution. Theories of Organic evolution. Sources of variation - Mutation, recombination, Isolation, Genetic drift, Neutral and Artificial evolution. Evolution of Human.	12
Keywords: Genetics, Mendel's law, Interaction of Gene, Sex Linkage, Sex Determination, Gametogenesis, Fertilization, Cleavage, Embryology, Regeneration, Parthenogenesis, Extra embryonic membrane, Placenta, Evolution,		

Part C - Learning Resource	
Text Books, Reference Books, Other Resources	
Suggested Readings:	
Text Books:	
1. Gardner, E.J. <i>et al.</i> (2006) Principles of Genetics (John Wiley).	
2. Russell, P.J. (2010) Genetics (Benjamin Cummings).	
3. Gardner, E.J., Simmons, M.J., Snustad, D.P. (2008). Principles of Genetics. (VIII edition) Wiley India.	
4. Snustad, D.P. and Simmons, M.J. (2009). Principles of Genetics. (V edition) John Wiley and Sons Inc.	
5. Klug, W.S., Cummings, M.R. and Spencer, C.A. (2012). Concepts of Genetics. (X edition) Benjamin Cummings.	
6. Carroll S.B.; Doebley J.; Griffiths, A.J.F. and Wessler, S.R. (2018) An Introduction to Genetic Analysis. W. H. Freeman and Co. Ltd.	
7. Gerhart, J. et al. (1997) Cells, Embryos and Evolution. Blackwell Science	
8. Gilbert, S.F. (2010) Developmental Biology (9th edition).	
9. Sinauer Wolpert, L. (2007) Principles of Developmental Biology (3rd edition). Oxford University Press.	
10. Campbell, N. and Reece, J. (2014) Biology (10th edition). Benjamin Cummings	
11. Ridley, M. (2004). Evolution. III Edition. Blackwell Publishing.	
12. Barton, N. H., Briggs, D. E. G., Eisen, J. A., Goldstein, D. B. and Patel, N. H. (2007). Evolution. Cold Spring, Harbour Laboratory Press.	
13. Hall, B. K. and Hallgrimsson, B. (2008). Evolution. IV Edition. Jones and Bartlett	
Online Resources –	
1. National digital Library.-	

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27.6.23
अध्ययन म
शहीद नंदकुमार पटेल
विश्वविद्यालय, रायगढ़ (उ.प्र.)

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uUKE9PQ

2. E-PG Pathshala.

https://epgp.inflibnet.ac.in/Home/ViewSubject?catid=2rAs1Puvga4LW93zMe83aA

3. eGyankosh- Genetics and Evolutionary Biology

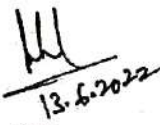
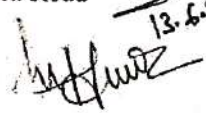
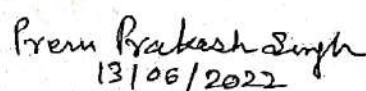
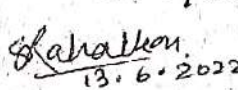

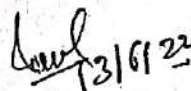
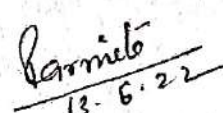
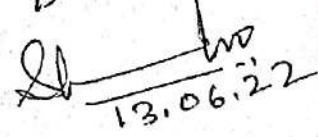
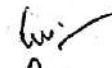
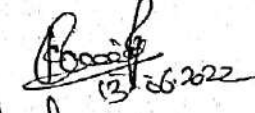

4. eGyanKosh: BZYCT-137 Genetics and Evolutionary Biology

Part D: Assessment and Evaluation

University Exam(UE): Maximum Marks: 50 Marks

DECLARATION


This is to certify that the syllabus is framed by the central board of study (Zoology) as per the guidelines of the department of higher education, Chhattisgarh government.

1. Dr. K. R. Sahu - Chairman -
Assistant Professor, Govt. Pandit Madhav Rao Sapre Collfge, Pendra Road 
13.6.2022
2. Dr. Ajit Hundet - Member -
Professor, Govt. D. B. Girls College, Raipur 
3. Dr. Prem Prakash Singh - Member -
Professor, Govt. College, Kusmi, Balrampur 
13/06/2022
4. Dr. Shubhada Rahalkar - Member -
Professor, Govt. Bilasa Girls P. G. College, Bilaspur 
13.6.2022
5. Dr. Anil Kumar Shrivastava - Member -
Professor, Govt. V. Y. T. P. G. Autonomous College, Durg 
6. Dr. R. K. Tamboli - Member -
Assistant Professor, Kirodimal Govt. Arts & Science College, Raigarh 
13/6/22
7. Dr. Parmita Dubey - Member -
Assistant Professor, Govt. J. Y. Chhattisgarh College, Raipur 
13.6.22
8. Dr. Shashi Gupta - Member -
Assistant Professor, Govt. Nagarjuna P. G. College of Science, Raipur 
13.06.22
9. Dr. L. P. Miri - Member -
Assistant Professor, Govt. J.P. Verma P. G. Arts & Commerce College, Bilaspur 
10. Dr. Rajesh Kumar Rai - Member -
Assistant Professor, Govt. Mahamaya College, Ratanpur, Bilaspur 
13.06.2022
11. Dr. Hema Kulkarni - Member -
Assistant Professor, Shahid Domeswar Sahu Govt. College, Jangaon R. Dist -Durg 

Date : 13.06.2022.


18.7.22
Chairman

Studies
and Name Patel
..... (C.G)


27/06/22
अध्ययन मंडल
शहीद नंदकुमार पटेल
विश्वविद्यालय, रायपुर (छ.ग.)

Part A: Introduction			
Program: Certificate Course	Class: B.Sc. II Year	Year: 2023	Session: 2023-2024
1. Course Code	ZOOI- 4T		
2. Course Title	Biochemistry and Molecular Biology		
3. Course Type	Theory		
4. Pre-requisite (if any)	No		
5. Course Learning Outcomes (CLO)	<p>At the end of this course, the students will be able</p> <ul style="list-style-type: none"> • Understand the structure and biological significance of carbohydrates, amino acids, proteins, lipids and nucleic acids. • Understand the concept of enzyme, its mechanism of action and regulation. • Learn the preparation of models of peptides and nucleotides. • Learn biochemical tests for amino acids, carbohydrates, proteins and nucleic acids. • Develop an understanding of concepts, mechanisms and evolutionary significance and relevance of molecular biology in the current scenario. • Understand the process of DNA replication, transcription and translation. 		
6. Credit Value	4		
7. Total Marks	Max. Marks: 50	Min Passing Marks: 17	

Part B: Content of the Course		
Total No. of Periods: 60		
Unit	Topics	No. of Period
I	<p>Biomolecules: Amino Acids, Peptides, and Proteins- structure of amino acids, peptide bond, Primary, secondary, tertiary and quaternary structure of proteins and their biological functions. Carbohydrates- Biological roles of carbohydrates, Structure of monosaccharides- Hexoses and pentoses. Disaccharides-Sucrose, lactose, maltose. Storage and structural polysaccharides-Glycogen, starch and cellulose. Lipids- Role of lipids in cellular architecture and functions. Definition and classification of lipids. Structure and function of fatty acids, triacylglycerols, phospholipids and sterols. Nucleic Acids- Role of nucleic acids in living system. Composition of nucleic acids-the purine and pyrimidine bases.</p>	12
II	<p>Enzymes and Metabolic Pathways: Enzyme - Nomenclature and classification, general properties, specificity, cofactors, isozymes and mechanism of enzyme action. Protein metabolism- Transamination and deamination, Urea cycle. Carbohydrate metabolism- Glycolysis, gluconeogenesis, Cori-cycle, TCA cycle, HMP shunt, glycogenolysis & glycogenesis (Glycogen synthesis) . Lipid Metabolism- Mobilization of triglycerides, metabolism of glycerol, β-oxidation of fatty acids, Ketogenesis and significance.</p>	12

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Dr. Nandkumar Patel
Principal (C.G)


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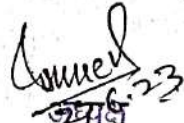
Dr. R. K. Jamboli
शहीद नंदकुमार पटेल
विश्वविद्यालय, रायगढ़ (छ.ग.)

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III	Structure of chromosomes, Nucleic acids and DNA replication: Structure of nucleic acids- Structure of DNA, forms of DNA, supercoiling of DNA, Nucleosomes, Histones, Structure of chromatin, chromosomes, packaging of DNA in the nucleus. Structure of RNA- Ribosomal RNA (rRNA), Transfer RNA (tRNA), Messenger RNA (mRNA), Noncoding RNA. DNA replication- Chemistry of DNA replication, enzymes involved, Unit of replication, replication origin and replication fork, accuracy during flow of genetic information, proof reading activity; Comparison of replication in prokaryotes and eukaryotes.	12
IV	Central dogma, RNA transcription, RNA processing: Central Dogma of Molecular Biology. Transcription (RNA Synthesis) - DNA-dependent RNA polymerases, sigma factor, bacterial promoters, the three stages of RNA synthesis- initiation, elongation and termination, rho dependent and rho-independent termination. Transcription in eukaryotes. RNA processing- splicing of hnRNA into mRNA, 5'-capping and 3'-polyadenylation of mRNA, differential RNA Processing, rRNA and tRNA modifications and processing.	12
V	Ribosomes and Translation (Protein Synthesis): Structure and types of Ribosome. Genetic Code- triplet codons, Wobble base, synonymous codons, degeneracy of codons, missense-, nonsense- and frame shift mutations. Translation- protein synthesis in <i>Prokaryote and its comparison with eukaryote.</i> , Aminoacylation of tRNA, initiation, elongation, peptide bond formation, translocation, termination, recycling of ribosome. Regulation of protein synthesis and codon bias - Post-translational modifications and processing of proteins.	12
Keywords: Biomolecules, biochemical pathways, Metabolism, Central dogma, Nucleic acids, chromosome, DNA replication, RNA Synthesis (Transcription), Protein Synthesis (Translation), Genetic code.		

Part C - Learning Resource	
Text Books, Reference Books, Other Resources	
Suggested Readings:	
Text Books:	
<ol style="list-style-type: none"> 1. Lehninger: Principles of Biochemistry (2013) 6th ed., Nelson, D.L. and Cox, M.M., W.H. Freeman & Company (New York), ISBN: 13: 978-1-4292-3414-6 / ISBN:10-14641-0962-1. 2. Berg, J.M.; Tymoczko, J.L. and Stryer, L. (2012) Biochemistry (7th edition) Freeman. 3. Conn, E.E.; Stumpf, P.K.; Bruening, G. and Doi, R.H. (2006) Principles of Biochemistry (5th edition) Wiley. 4. Stryer, Lubert (1981) Biochemistry, 2nd Edition. W. H. Freeman and Company, New York. 5. Watson, J.D. <i>et al.</i> (2013) Molecular Biology of the Gene (7th edition) CSHL Press Pearson. 6. Karp, G. 2010. Cell and Molecular Biology: Concepts and Experiments. 6th Edition, John Wiley & Sons. Inc. 7. Walter, P. (2007) Molecular Biology of the Cell (5th edition) Garland Science. 8. Bruce Alberts, Alexander Johnson, Julian Lewis, Martin Raff, Keith Roberts, and Peter Walter(2002) Molecular Biology of the Cell, 4th edition. New York: Garland Science. 9. Harvey Lodish, Arnold Berk, Paul Matsudaira, Chris A. Kaiser, Monty Krieger, 	


 18.7.23
 Chairperson
 of Studies
 (Dr. Nandini)


 23
 (Dr. R. K. Tombole)
 शहीद नंदकुमार पटेल
 विश्वविद्यालय, रायगढ़ (छ.ग.)

Freeman(2003) Molecular Cell Biology, 5th edition. W. H. & Company.

Online resources (Try to include similar course available on SWAYAM/NPTEL/CEC etc.)

https://onlinecourses.nptel.ac.in/noc20_cy10/preview

<https://www.classcentral.com/course/swayam-biochemistry-iitm-22920>

https://onlinecourses.swayam2.ac.in/cec20_ma13/preview


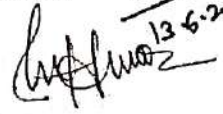
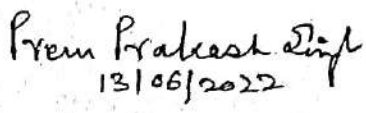
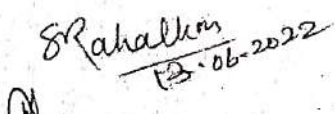

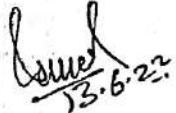
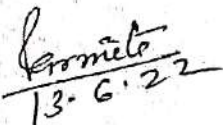
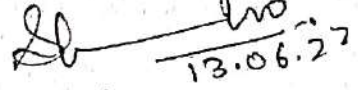
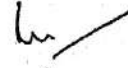
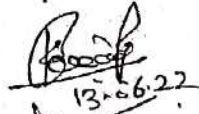
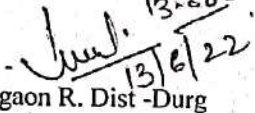
<https://www.classcentral.com/course/swayam-molecular-biology-19952>

Part D: Assessment and Evaluation


University Exam (UE) : Maximum Marks: 50

DECLARATION

This is to certify that the syllabus is framed by the central board of study (Zoology) as per the guidelines of the department of higher education, Chhattisgarh government.

1. Dr. K. R. Sahu - Chairman -
Assistant Professor, Govt. Pandit Madhav Rao Sapre College, Pendra Road 
13.6.2022
2. Dr. Ajit Hundet - Member -
Professor, Govt. D. B. Girls College, Raipur 
13.6.2022
3. Dr. Prem Prakash Singh - Member -
Professor, Govt. College, Kusmi, Balrampur 
13/06/2022
4. Dr. Shubhada Rahalkar - Member -
Professor, Govt. Bilasa Girls P. G. College, Bilaspur 
13.06.2022
5. Dr. Anil Kumar Shrivastava - Member -
Professor, Govt. V. Y. T. P. G. Autonomous College, Durg 
6. Dr. R. K. Tamboli - Member -
Assistant Professor, Kirodimal Govt. Arts & Science College, Raigarh 
13.6.22
7. Dr. Parmita Dubey - Member -
Assistant Professor, Govt. J. Y. Chhattisgarh College, Raipur 
13.6.22
8. Dr. Shashi Gupta - Member -
Assistant Professor, Govt. Nagarjuna P. G. College of Science, Raipur 
13.06.22
9. Dr. L. P. Miri - Member -
Assistant Professor, Govt. J.P. Verma P. G. Arts & Commerce College, Bilaspur 
10. Dr. Rajesh Kumar Rai - Member -
Assistant Professor, Govt. Mahamaya College, Ratanpur, Bilaspur 
13.06.22
11. Dr. Hema Kulkarni - Member -
Assistant Professor, Shahid Domeswar Sahu Govt. College, Jamgaon R. Dist -Durg 
13/6/22

Date : 13.06.2022.


13/6/22
Nandkumar Patel
Bilaspur, B. G. C. C.

Part A: Introduction			
Program: Certificate Course	Class: B.Sc. II Year	Year: 2023	Session: 2023-2024
1	Course Code	ZOOL-2P	
2	Course Title	Lab Course - 2	
3	Course Type	Practical	
4	Pre-requisite (if any)	No	
5	Course Learning Outcomes (CLO)	<p>After completion of practical work the outcome will be :</p> <ul style="list-style-type: none"> • Able to understand and explain Mendel's Law of Inheritance • Capable to analyze inheritance of gene by pedigree analysis. • Able to know laboratory culture of Drosophila. • Able to understand cytological, histological and osteological configuration for animal life. • Capable to understand Human karyotype and Numerical alteration in chromosomes • Capable to explain Evolution and evidences • Capable of performing tests for identification of biological macromolecules • Able to estimate nucleic acids and Isolation of DNA 	
6	Credit Value	2	
7	Total Marks	Max. Marks: 50	Min Passing Marks : 17

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18.7.24
Chairman

Studies
Nandkumar Patel
Rajalaya, Raigarh (C.G)

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27.6.23
अध्यक्ष (प्र. सं. क. टा. सं. क.)
शहीद नंदकुमार (स.ग.)
विश्वविद्यालय, रायगढ़ (छ.ग.)

Part B		
Total No. of Lecturer (one hour per week)		
Total Periods: 30		
	Contents	No. of period
	<p>Tentative list of practical/exercise:</p> <ol style="list-style-type: none"> 1. Application of probability in the law of segregation with coin tossing. 2. Study of mode of inheritance of the following traits by pedigree charts – attached ear lobe, widow's peak. 3. Familiarization with techniques of handling <i>Drosophila</i>, identifying males and females; observing wild type and mutant (white eye, wing less) flies, and setting up cultures. 4. Study of human karyotypes and numerical alterations (Down syndrome, Klinefelter syndrome and Turner syndrome). 5. Types of eggs based on quantity and distribution of yolk: sea urchin, insect, frog, Chick. 6. Comparative study of cleavage patterns in Frog and Amphioxus models. 7. How do cells move, change shape and size during morphogenetic movement of Blastulation, Gastrulation in Frog, Amphioxus, Chick 8. Study of development of chick embryo through incubated chick eggs up to 96 h. 9. Extra embryonic membranes of chick through permanent slides. 10. Some videos to develop understanding on the process of development. 11. Study of adaptive radiations in feet of birds and mouth parts of insects. 12. Understanding embryological evidence of evolution (through charts and videos). 13. Study of types of fossils. 14. Analogy and homology (wings of birds and insects, forelimbs of bat and rabbit). 15. Preparation of models of amino acids and dipeptides. 16. Ninhydrin test for α-amino acids. 17. Determination of pK and pI values of glycine. 18. Benedict's test for reducing sugars. 19. Iodine test for starch. 20. Determination of acid value of oil 21. Preparation of ball and stick model for B-DNA molecule (A=T and G=C base pairs). 22. Estimation of DNA by DPA method. 23. Estimation of RNA by Orcinol method. 24. Isolation of genomic DNA by ethanol precipitation method. 	30
<p>Keywords: Genetics, Mendel's law, Interaction of Gene, Embryology, Regeneration, Evolution.</p>		

Amul
19.7.21

Amul
Nandkumar Patel
Rajalaya, Raigadh (C.G)

Amul
23

(Dr. R. K. Tumbale)
शहीद नंदकुमार
विश्वविद्यालय, रायगढ़ (ज.ग.)

Part C - Learning Resource

Text Books, Reference Books, Other Resources

Suggested Readings:

Text Books:

1. Practical Hand Book of Genetics: Vikas Pali Kalyani Publication
3. Essential Practical Handbook of Cell Biology & Genetics, Biometry & Microbiology, A Laboratory Manual Debarati Das, Academic Publishers.
4. Cytogenetics: Mohan P Arora, Himalayan Publishing House
5. Modern Experimental Biochemistry by Rodney F. Boyer
6. Molecular Cloning: A Laboratory Manual by Joe Sambrook
7. Practical Manual for Biochemistry : By GG Kaushik, CBS Publication

E-Resources:

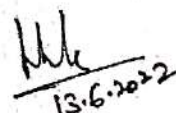
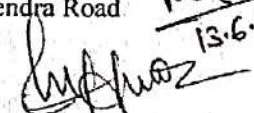
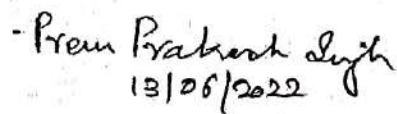
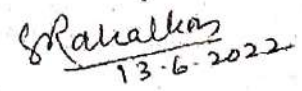

1. https://onlinecourses.nptel.ac.in/noc22_cy32/preview
2. <https://www.classcentral.com/course/swayam-experimental-biochemistry-12909>
3. <https://jru.edu.in/studentcorner/lab-manual/bpharm/Lab%20Manual%20-%20Biochemistry.pdf>
4. Fundamentals of Genetics.pdf (jru.edu.in)

Part D: Assessment and Evaluation

Practical Exam(UE): Maximum Marks: 50 Marks


DECLARATION

This is to certify that the syllabus is framed by the central board of study (Zoology) as per the guidelines of the department of higher education, Chhattisgarh government.

1. Dr. K. R. Sahu - Chairman -
Assistant Professor, Govt. Pandit Madhav Rao Sapre Collfge, Pendra Road 
13.6.2022
2. Dr. Ajit Hundet - Member -
Professor, Govt. D. B. Girls College, Raipur 
3. Dr. Prem Prakash Singh - Member -
Professor, Govt. College, Kusmi, Balrampur 
13/06/2022
4. Dr. Shubhada Rahalkar - Member -
Professor, Govt. Bilasa Girls P. G. College, Bilaspur 
13.6.2022
5. Dr. Anil Kumar Shrivastava - Member -
Professor, Govt. V. Y. T. P. G. Autonomous College, Durg 


13.6.2022

Dr. Anil Kumar Shrivastava
Head of Department
Department of Zoology
Jawahar Education Society's College
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27.6.22
अध्यक्ष मंडल
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6. Dr. R. K. Tamboli - Member -
Assistant Professor, Kirodimal Govt. Arts & Science College, Raigarh
7. Dr. Parmita Dubey - Member -
Assistant Professor, Govt. J. Y. Chhattisgarh College, Raipur
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11. Dr. Hema Kulkarni - Member -
Assistant Professor, Shahid Domeswar Sahu Govt. College, Jamgaon (R), Durg

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13.6.22

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13/6/22

Date: 13.06.2022.

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18.7.22

Chairman
Studies
Dr. Nandkumar Patel
Raigarh (C.G)

Handwritten signature
20/6/22
Dr. R. K. Tamboli
अध्यक्ष, मंडल
शहीद नंदकुमार पटेल
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