

## Bachelor of Science – Information Technology B.Sc. (I.T.) (NEP 2020)

### SEMESTER 3

Subject Code	Subject Name	COs
1013111	Python Programming	<ol style="list-style-type: none"><li>1. Demonstrate mastery of Python features to tackle a wide range of programming challenges.</li><li>2. Utilize control flow statements to ensure accurate and logical program execution.</li><li>3. Efficiently manipulate arrays, strings, and data structures to enhance. data handling and problem-solving.</li><li>4. Design modular, efficient programs by leveraging functions, modules, and string operations.</li><li>5. Manage file operations, employ regular expressions, and manipulate date and time data to improve program functionality and performance.</li></ol>
1013112	Data Structures	<ol style="list-style-type: none"><li>1. Demonstrate knowledge of core data structures and their operations</li><li>2. Analyze the time and space complexity of algorithms and choose the most efficient solution for a given problem.</li><li>3. Translate algorithmic solutions into correctly functioning code using their chosen programming language.</li></ol>

		<p>4. Implement and traverse binary trees and binary search trees, demonstrating their understanding of these structures.</p>
1013113	Operating System	<p>1. Outline the basic concept of operating systems</p> <p>2. Analyze the working of operating system</p> <p>3. Examine the working of various scheduling approaches</p> <p>4. Apply the concepts of synchronization and deadlock</p> <p>5. Apply the file access mechanisms</p>
1013114	Major Practical 3	<p>1. Apply Python programming concepts like input/output, conditional statements, and loops, to solve fundamental problems effectively.</p> <p>2. Demonstrate proficiency in performing basic operations, indexing, slicing, and analyzing attributes of arrays using NumPy.</p> <p>3. Apply functions, recursion, and lambda expressions to solve computational problems, and implement modular programming for reusable and efficient code design.</p> <p>4. Implement lists and dictionaries, perform file operations, and use functions to solve real-world problems effectively.</p> <p>5. Process text, extract information, handle dates, and measure execution time for solving complex real-world problems.</p>

		<p>6. Ability to implement and manipulate basic and advanced data structures to solve real world problems.</p> <p>7. Proficiency in writing efficient algorithms using suitable data structures for operations like searching, sorting, and traversal.</p> <p>8. Capability to analyze the time and space complexity of algorithms for various data structures.</p> <p>9. Enhanced problem-solving skills by applying data structures in different domains such as databases, networks, and operating systems</p>
1083213	Operation Research-I	<p>1. Optimize the cost, time profit or loss through Linear Programming Problem</p> <p>2. Make best transportation schedule with minimum cost and to maximize profit</p> <p>3. Optimal allocation or assignment of Jobs to machines</p>
1083214	Practical based on operation Research-I	<p>4. Optimize the cost, time profit or loss through Linear Programming Problem</p> <p>5. Make best transportation schedule with minimum cost and to maximize profit</p> <p>6. Optimal allocation or assignment of Jobs to machines</p>
1253311	Fintech Startup	<p>1. Students will be able to analyse and describe the key components of the modern Fintech landscape, identifying</p>

		<p>major trends and the role of AI and other core technologies.</p> <p>2. Students will be able to construct a comprehensive business model for a Fintech startup, demonstrating proficiency in market analysis, and financial planning.</p> <p>3. Students will be able to critically analyze the operational, regulatory, and technological challenges and opportunities associated with specific Fintech applications.</p>
1013411	Applied Mathematics	<p>1. Familiar with the various forms and operations of a complex number.</p> <p>2: Find the Laplace transform of a function using definition.</p> <p>3: Find the Inverse Laplace transform of a function using definition.</p> <p>4: Solve Differential equations of first degree and first order.</p> <p>5: Solve Differential equations of first degree and higher order.</p>
2513511	Hindi- हिंदी भाषा व्यवहारिक प्रयोग	<p>1. विद्यार्थियों को राज्यभाषा हिंदी का ज्ञान प्राप्त होगा, एवं दक्षता प्राप्त होगी।</p> <p>2. विद्यार्थियों को राजभाषा हिन्दी के व्याकरणिक प्रयोग की जानकारी प्राप्त होगी।</p> <p>3. विद्यार्थियों को हिंदी संज्ञा आदि का ज्ञान प्राप्त होने के साथ भाषा के शुद्ध, व्यवहारिक रूप का ज्ञान होगा।</p> <p>4. विद्यार्थियों को कारकों, वाक्य रचना एवं भाषिक चिन्हों आदि का ज्ञान प्राप्त होगा।</p>

2523625	Field Project	<ol style="list-style-type: none"><li>1. Apply concepts learned in classrooms to real-world socioeconomic conditions enhancing their understanding and skills.</li><li>2. Show insights into the challenges, opportunities and culture of socioeconomic diversity, preparing them for future role as responsible citizens.</li><li>3. Demonstrate evidence of research aptitude and skills of critical thinking, analytical skills, and ethical research conduct in field work.</li><li>4. Display problem-solving abilities in making informed decisions in complex scenarios through practical situations.</li><li>5. Work in teams and collaborate to achieve common goals in the work field environments through collaborative efforts.</li><li>6. Show integrity in their dealings with their work and the people that they interact with by upholding professional; principles and ethical standards.</li></ol>
2523620	NSS- Study of Indian Social Reformers	<ol style="list-style-type: none"><li>1. The course will help students comprehend the foundations of the National Service Program.</li><li>2. To understand the unique camping program.</li><li>3. Students will learn about the regular activities of NSS.</li></ol>

<p>2523616</p>	<p>Work Extension - DLLE</p>	<ul style="list-style-type: none"> <li>• To ensure equal access to quality education and educational opportunities to aspirants.</li> <li>• To support the government initiatives in achieving universal foundational literacy and numeracy as per sustainable development program.</li> <li>• To organize remedial programs to address the learning breaches among the youth and provide unending education opportunities.</li> <li>• To offer more holistic, multidisciplinary, and flexible curricular activities with an emphasis on conceptual understanding and personality development.</li> <li>• To offer a wide range of activities &amp; promote critical thinking, creativity, and innovation.</li> <li>• To provide aspirants with multiple pathways for skill development and employment.</li> <li>• To implement outreach programs to disseminate knowledge, provide services, and support community development.</li> </ul>
<p>2523612</p>	<p>Introduction to Sports Training &amp; Tests and Measurement</p>	<ul style="list-style-type: none"> <li>• Understand and apply the principles of sports training.</li> <li>• Identify and differentiate between various training methods.</li> <li>• Develop effective exercise plans and training schedules.</li> <li>• Evaluate the impact of training on performance enhancement.</li> </ul>

**SEMESTER 4**

<b>Subject Code</b>	<b>Subject Name</b>	<b>COs</b>
1014111	Core Java	<p>OC1. Understand the basics of Java and its runtime environment.</p> <p>OC2. Be proficient in using Java's data types, control flow statements, and OOP principles such as classes, inheritance, and exception handling.</p> <p>OC3. Creating own classes and objects</p> <p>OC4. Develop mini projects using Class, Interface and exception handling</p>
1014112	Software Engineering	<p>OC1: Demonstrate a comprehensive understanding of Agile concepts and Scrum practices.</p> <p>OC2: Apply Scrum processes to effectively manage software development life cycles.</p> <p>OC3: Create and prioritize user stories for efficient Product Backlog management.</p> <p>OC4: Utilize metrics to evaluate and enhance Sprint performance and team productivity.</p>

		<p>OC5: Implement strategies for cost, customer, and risk management in Scrum projects.</p> <p>OC6: Formulate effective Sprint retrospectives to drive continuous improvement.</p>
1014113	Computer Networks	<p>1.Understanding the Transport layer protocols and their utilities</p> <p>2.Various application layer protocols and their implementation</p> <p>CO3:Mailing Services and web services implementation</p>
1014114	Major Practical 4	<p>1. Write efficient Java programs to perform arithmetic operations, manage control flow, and manipulate strings.</p> <p>2. Demonstrate knowledge of object-oriented concepts by implementing inheritance, polymorphism, and interfaces.</p> <p>3. Apply exception handling mechanisms to create robust Java applications.</p> <p>4.1Implement multithreading and explore dynamic initialization for advanced Java programming.</p>

1084213	Operation Research-II	<ol style="list-style-type: none"><li>1. Optimize the cost, time profit or loss through Linear Programming Problem</li><li>2. Make best transportation schedule with minimum cost and to maximize profit</li><li>3. Optimal allocation or assignment of Jobs to machines</li></ol>
1084214	Practical based on Operation Research-II	<ol style="list-style-type: none"><li>4. Optimize the cost, time profit or loss through Linear Programming Problem</li><li>5. Make best transportation schedule with minimum cost and to maximize profit</li><li>6. Optimal allocation or assignment of Jobs to machines</li></ol>
1234311	Management Skills	<ol style="list-style-type: none"><li>1. Implement self-management strategies to improve productivity through better Time planning and emotional regulation.</li><li>2. Demonstrate effective team management by fostering clear communication and mentoring within a team.</li></ol>

		<p>3. Apply decision-making frameworks to analyse real-world business or personal challenges efficiently.</p>
1014411	Computer Graphics	<p>1. Understanding the Transport layer protocols and their utilities</p> <p>2. Various application layer protocols and their implementation</p> <p>CO3: Mailing Services and web services implementation</p>
2514511	Introduction to communication skills in English II	<p>Demonstrate an understanding of English Usage in Communication</p> <p>Exhibit the ability to Read a variety of written text using subskills such as analyzing and interpreting text.</p> <p>Show competence in comprehending a variety of oral texts.</p> <p>Actively participate in group discussion, and research and prepare for the interview effectively</p> <p>Display advanced formal (email writing, report writing) and creative writing skills.</p>

2524630	Community Engagement Project	<ol style="list-style-type: none"><li>1. Tackle/ Understand the societal issues more efficiently and effectively.</li><li>2. Apply concepts learned in classrooms to real-world socio-economic conditions enhancing their understanding and skills.</li><li>3. Show insights into the challenges, opportunities and culture of socioeconomic diversity, preparing them for future roles as responsible citizens.</li><li>4. Demonstrate evidence of research aptitude and skills of critical thinking, analytical skills, and ethical research conduct in field work.</li><li>5. Display problem-solving abilities in making informed decisions in complex scenarios through practical situations.</li><li>6. Work in teams and collaborate to achieve common goals in the work field environments through collaborative efforts.</li><li>7. Show integrity in their dealings with their work and the people that they interact with by upholding</li></ol>
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		professional; principles and ethical standards.
2524614	Extension Work	<ul style="list-style-type: none"> <li>• To ensure equal access to quality education and educational opportunities to aspirants.</li> <li>• To support the government initiatives in achieving universal foundational literacy and numeracy as per sustainable development program.</li> <li>• To organize remedial programs to address the learning breaches among the youth and provide unending education opportunities.</li> <li>• To offer more holistic, multidisciplinary, and flexible curricular activities with an emphasis on conceptual understanding and personality development.</li> <li>• To offer a wide range of activities &amp; promote critical thinking, creativity, and innovation.</li> <li>• To provide aspirants with multiple pathways for skill development and employment.</li> <li>• To implement outreach programs to disseminate knowledge, provide services,</li> </ul>

		and support community development.
2524611	National Service Scheme (Youth and Disaster Management)	<ol style="list-style-type: none"> <li>1. The course will help students comprehend the foundations of the National Service Program.</li> <li>2. To understand the unique camping program.</li> <li>3. Students will learn about the regular activities of NSS.</li> </ol>
2524612	Advanced Sports Training and Performance Evaluation	<ul style="list-style-type: none"> <li>• Gain practical knowledge of sports training principles and methods.</li> <li>• Develop the ability to conduct, evaluate, and interpret various fitness and skill-based tests.</li> <li>• Learn to design and implement personalized and professional training programs.</li> <li>• Acquire experience in organizing and volunteering in sports and fitness events.</li> <li>• Understand the role of psychological, fitness, and skill tests in enhancing performance.</li> </ul>

