**DEPARTMENT OF BOTANY**

**Add on Course Title: Certificate course in basic computer tools for biological sciences**

**Course Description:**

This course provides an introduction to essential computer applications for students in the field of biological science. The course focuses on developing skills in Microsoft Word, Excel, PowerPoint, and additional tools such as MEGA, BioEdit that are used in biological research and analysis. Students will learn the fundamental concepts and practical applications of these tools to enhance their research, data management, and presentation abilities. Through hands-on exercises and projects, students will gain proficiency in using these software applications for their academic and professional pursuits.

After successful completion of this course the students will :

* Have knowledge and proficiency in MS-word, Excel, PowerPoint, MEGA and BioEdit.
* They will be skilled in writing scientific documents, managing and analysing data, creating professional presentations and using specialized biological research tools.

**Course outcome:** The course outcomes of the above course on essential computer applications for students in the field of biological science would include:

* Proficiency in using Microsoft Word, Excel, and PowerPoint for scientific document creation, data management, and professional presentations.
* Familiarity with additional tools such as MEGA and BioEdit for biological research and analysis.
* Understanding of fundamental concepts and practical applications of software tools in enhancing research, data management, and presentation abilities.
* Hands-on experience through exercises and projects, developing practical skills in using these software applications for academic and professional pursuits.
* Improved research, data management, and presentation abilities, enabling students to effectively communicate scientific information and findings.
* Enhanced proficiency in organizing and analyzing biological research data, including performing calculations, creating charts and graphs, and utilizing statistical functions.
* Improved presentation and communication skills, both verbally and visually, for effective scientific communication.
* Preparation for academic and professional pursuits in the field of biological science, with the ability to utilize computer applications in research, data management, and presentations.

General Information and Course Structure:

* Name of the course: Certificate course in basic computer tools for biological sciences
* Credit: 2
* Level: Certificate
* Stream : Open
* Eligibility criteria: 10+2
* Duration : 15 weeks
* Language: Assamese, English, Hindi
* Seat Capacity: 15
* Fees: Rs. 300 only
* Selection/Admission criteria: First come first serve
* Attendance: 75%
* Teaching mode: Offline class and demonstration, Hands on practice etc.
* Academic calendar for the course: 2 days in a week (1 day theory and 1 day practical)

Examination structure:

ASSESSMENT: The competency assessment will be done by the departmental assessor ensuring an impartial assessment. The assessment process through assessing bodies aims to test and certify the competency of the student.

Candidates are to demonstrate that they are able to do the following under assessment:

1. Assess students’ engagement in class discussions, their ability to apply theoretical knowledge to practical scenarios.

2. Their improvement in using software tools, data management skills and presentation skill etc.

EXAMINATION:

At the end of the course, both the theory and practical examination will be conducted. Its notice and time table will be displayed for communication to the students at least before 15 days of the examination.

1. Course: BPCC-BOT-024: Theory : 50 marks (2.5 hours)

2. Course: BPCC-BOT-024-P: Practical paper : 50 marks (3 hours)

MARKING SCHEME AND AWARD OF GRADES: Average of the marks obtained in each paper will be calculated as 50(theory) + 50(Practical)= 100(total)

Pass regulation:

Minimum passing marks for theory is 50%

Minimum passing marks for practical is 50%

1. 91-100 marks = O grade, 5 points
2. 81-90 marks = A grade, 4 points
3. 71-80 marks = B grade, 3 points
4. 61-70 marks = C grade, 2 points
5. 48-60 marks= D grade, 1 point

CERTIFICATE: Successful candidates will be awarded training certificates issued by the college.

**Course Syllabus:**

**THEORY:** BPCC-BOT-024

**UNIT 1: 2 hours**

Introduction to Computer Applications for Biological Science, Understanding the importance of computer skills in biological research, Overview of Microsoft Office suite and its applications.

**UNIT 2: 3 hours**

Introduction to Microsoft Word, Basic features and functionalities of Microsoft Word, Formatting documents for scientific writing, Creating and organizing tables, Inserting images and figures, Advanced features of Microsoft Word for scientific writing, Working with references and citations, Creating and formatting bibliographies, Collaborative editing and track changes.

**UNIT 3: 3 hours**

Introduction to Microsoft Excel, Basic spreadsheet operations and data entry, Formulas and functions for biological data analysis, Sorting, filtering, and formatting data, Advanced data manipulation and analysis in Microsoft Excel, Data visualization using charts and graphs, creating basic statistical analyses, Importing and exporting data.

**UNIT 4: 3 hours**

Introduction to Microsoft PowerPoint, Design principles for scientific presentations, creating effective slides and layouts, incorporating multimedia elements, Advanced features of Microsoft PowerPoint for scientific presentations, Slide transitions and animations, creating speaker notes and handouts, Rehearsing and delivering presentations.

**UNIT 5: 4 hours**

Introduction to Additional Tools for Biological Research (e.g., MEGA, BioEdit), Overview of the tool's functionalities and applications in biology, Basic operations and data, management using the tool, Intermediate operations and analysis using the additional tool, Data visualization and plotting, Integrating the tool with other applications, generating reports and exporting results.

PRACTICAL :BPCC-BOT-024-P 15 hours

1. Creating a scientific research report with custom styles, table of contents, cross-referencing, and bibliography management.
2. Analysing a biological dataset using advanced functions, array formulas, pivot tables, and data visualization techniques.
3. Developing scientific presentation with multimedia elements, slide transitions, embedded macros, and interactive features.
4. Performing sequence alignment using MEGA software, incorporating multiple sequence alignment, profile alignment, and phylogenetic tree printing.
5. Conducting advanced phylogenetic analysis using MEGA software, including maximum likelihood or Bayesian inference methods.
6. Utilizing advanced molecular editing features in BioEdit software, such as advanced motif search, primer design, mutation analysis, and secondary structure prediction
7. Viva-voce
8. Practical record book

Suggested Readings:

1. Goel, A. (2010). Computer Fundamentals. India: Pearson Education.
2. Agarwal, S. (2020). Fundamentals of Computer. SBPD Publishing House, Agra.
3. Lambert, J., & Frye, C. (2016). Microsoft Office 2016. Microsoft press.
4. Duarte, N. (2008). *Slide: ology: The art and science of creating great presentations* (Vol. 1). Sebastapol: O'Reilly Media.
5. Xia, X. (1959). Data analysis in molecular biology and evolution. Kluwer Academic Publishers

The Add-on course on “**Certificate course in basic computer tools for biological sciences”** is hereby approved for the session 2023-24 in the Department of Botany, B. P. Chaliha College, Nagarbera.

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