FACULTY OF SCIENCE

SYLLABI

FOR

COMPUTER SUBSIDIARY FOR
B.Sc. (Hons. School) Mathematics, Physics Students
&
M.Sc. (Hons. School) Biophysics, Biochemistry, Microbiology and Zoology Students

EXAMINATIONS 2012-2013

--:O:--
Computer Applications:

SECTION - A
Introduction to Computers: General model of computer system; Brief description of various components of computer; input/output devices, types of auxiliary storage: classification of computers on chronology, size architecture; configuration of Pentium.

SECTION - B
Introduction to operating system, functions of an operating system; types of operating systems, internal/external commands of MS-DOS, using editor. Windows OS, Features: File & director Management, Accessories,

SECTION – C
Introduction to Word-processing: Word processing concepts, general characteristics of word processing packages using MSWORD; Editing and Formatting Feature.

SECTION - D
Introduction to Spreadsheet data organization concepts, USING MS-Excel including graphics facility. Introduction to statistical packages i.e. stat-graphics. Mathematical and Statistical Functions; Absolute, Relative and Mixed Addressing.

4. Joe Harbraken : Learn MS-Office 2000 8 in 1, PHI.
SECOND SEMESTER

Course No. BP – 45 : FORTRAN and Bioinformatics

Max. Marks : 100
Ext. 80 + Int. 20

Total Lectures : 70

Note :

i. The Question Paper will consist of five Sections A, B, C, D, and E comprising of total of NINE questions.

ii. Examiner will set TWO questions each in Sections A, B, C, D and ONE question in Section E. The Examiner will set 7-10 short answer type questions in Section C covering the whole syllabus.

iii. The students are required to attempt FIVE questions in all by selecting ONE question each from Section A, B, C, D and Section E is compulsory.

iv. All questions carry equal marks.

Objectives: The course aims at familiarizing students with basics of FORTRAN Programming and Bio-informatics.

FORTRAN

SECTION - A
Problem solving on computers using FORTRAN. Concepts of algorithm and flow charting; features of FORTRAN language.

SECTION - B
Programming in FORTRAN for simple statistical methods (mean, standard deviation, regression line, correlation); programming in FORTRAN for sorting, matrix multiplication.

BIOINFORMATICS

SECTION - C
Information theory and Biology-entropy and information – Shannon’s formulae – Divergences from equaprobability and independence elementary ideas about Markoff Chains and Ergodic processes – Redundancy concepts, applications to DNA and problem sequences.

SECTION - D
Use of databases in Biology: Sequence databases EMBL, NBAF, protein structural databank: sequence analysis of proteins and nucleic acids: structure prediction, simple molecular modeling.

References:

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<td>2.</td>
<td>RajaRaman, V., 1983</td>
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<td>RajaRaman, V.</td>
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COMPUTER SUBSIDIARY FOR THE SESSION 2012-2013

FIRST SEMESTER

Course Title: Computer Applications (5 hours per week).

Subsidiary course being offered to
1. Mathematics B.Sc. (H.S.) 1st Year
2. Physics B.Sc. (H.S.) 2nd Year

Scheme of Examination:

<table>
<thead>
<tr>
<th>Paper</th>
<th>Subject</th>
<th>Exam Hours</th>
<th>Ext.</th>
<th>Int.</th>
<th>Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paper A</td>
<td>Computer Applications</td>
<td>3</td>
<td>65</td>
<td>10</td>
<td>75</td>
</tr>
<tr>
<td>Paper C</td>
<td>Practical Based on Paper - A</td>
<td>3</td>
<td>25</td>
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<td>25</td>
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</tbody>
</table>

Note:

i. The Question Paper will consist of five Sections A, B, C, D, and E comprising of total of NINE questions.
ii. Examiners will set TWO questions each in Sections A, B, C, D and ONE question in Section E. The Examiner will set 7-10 short answer type questions in Section C covering the whole syllabus.
iii. The students are required to attempt FIVE questions in all by selecting ONE question each from Section A, B, C, D and Section E is compulsory.
iv. All questions carry equal marks.

Objectives: To introduce the basics of Computer Hardware, Software and Programming in FORTRAN.

Paper A: Computer Applications

SECTION - A

Introduction to Computers:
General model of computer system; Brief description of various components of computer; Input/Output devices; types of auxiliary storage; Classification of computers on chronology, size and architecture; configuration of PC.

SECTION - B

Introduction to Operating System:
Functions of an operating system; types of operating system; Internal/External commands of MS-DOS) Using editor. Windows OS, Features: File & directory Management, Accessories.

SECTION - C

Introduction to Word-processing and Spreadsheet:
Word-processing concepts; General characteristics of Word-Processing packages; using MS-WORD; Editing and Formatting Feature. Data Organisation concepts; using Excel including graphics facility. Mathematical and Statistical Functions; Absolute, Relative and Mixed Addressing. Power Point and Internet concept

SECTION – D

Algorithm and Flowcharting:
Concepts of algorithm and flowcharting; Features of FORTRAN language – Constants, variables, operators, expressions, control structures, arrays, subprograms and Sub-routines; Programming in FORTRAN for simple statistical methods (Mean, Standard deviation); programming in FORTRAN for sorting, matrix multiplication.

References:

4. Harbraken, Joe : Learn MS-Office 2000 8 in 1, PHI.
5. Taxali, R. K. : PC Software for Windows 98 made simple, Tata
7. RajaRaman, V. : Computer Programming in FORTRAN 90 & 95, PHI.

Paper C : Practical Based on Paper - A.
SECOND SEMESTER

Course Title: Numerical Methods and FORTRAN Programming (5 hours per week).

Subsidiary course being offered to
1. Mathematics B.Sc. (H.S.) 1st Year
2. Physics B.Sc. (H.S.) 2nd Year

Scheme of Examination:

<table>
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<tr>
<th>Paper</th>
<th>Exam hours</th>
<th>Ext.</th>
<th>Int.</th>
<th>Theory/Practical Marks</th>
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</thead>
<tbody>
<tr>
<td>Paper B: Numerical Methods &amp; Fortran Programming</td>
<td>3</td>
<td>65</td>
<td>10</td>
<td>75</td>
</tr>
<tr>
<td>Paper D: Practical Based on Paper B</td>
<td>3</td>
<td>25</td>
<td>-</td>
<td>25</td>
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</tbody>
</table>

Note:
1. The Question Paper will consist of five Sections A,B,C,D, and E comprising of total of NINE questions.
2. Examiner will set TWO questions each in Sections A,B,C,D and ONE question in Section E. The Examiner will set 7-10 short answer type questions in Section C covering the whole syllabus.
3. The students are required to attempt FIVE questions in all by selecting ONE question each from Section A,B,C,D and Section E is compulsory.
4. All questions carry equal marks.

Objectives: To develop the understanding of Numerical Methods and their programming in FORTRAN.

SECTION - A

SECTION - B

SECTION - C

SECTION - D
Methods of solving Linear Simulations equation, Jacobi Method Gauss-Elimination method. Inversion of Matrix, Least square fitting correlation, regression.

Developing FORTRAN programs for all above numerical methods file.

References:

Paper D: Practical Based on Paper - B.
COMPUTER SUBSIDIARY FOR THE SESSION 2012-2013
FIRST SEMESTER

Course Title : Computer Applications  
Course Hrs : 90

Subsidiary Course is being offered to:
1. Zoology, M.Sc. (H.S) 1st year
2. Biophysics, M.Sc.(H.S) 1st year
3. Biochemistry M.Sc. (H.S.) 1st year
4. Microbiology, M.Sc. (H.S.) 1st year

Scheme of Examination:

<table>
<thead>
<tr>
<th>Exam</th>
<th>Theory/Practical</th>
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<tbody>
<tr>
<td>hours</td>
<td>Marks</td>
</tr>
<tr>
<td>Paper A: Computer Applications</td>
<td>3</td>
</tr>
<tr>
<td>Paper C: Practical Based on Paper A</td>
<td>3</td>
</tr>
</tbody>
</table>

Objectives: The course enables students to know the basic of Computers Operating Systems and applications software.

Paper A: Computer Applications

Note:

i. The Question Paper will consist of five Sections A,B,C,D, and E comprising of total of NINE questions.

ii. Examiner will set TWO questions each in Sections A,B,C,D and ONE question in Section E. The Examiner will set 7-10 short answer type questions in Section C covering the whole syllabus.

iii. The students are required to attempt FIVE questions in all by selecting ONE question each from Section A,B,C,D and Section E is compulsory.

iv. All questions carry equal marks.

SECTION - A

Introduction to Computers:
General model of computer system Brief description of various components of Computer; Input/Output devices; Types of auxiliary storage; classification of computer on Chronology, size and architecture; configuration of Pentium.

SECTION - B

Introduction to Operating System:
Functions of an operating system; types; of operating system; Internal/External commands of MS-DOS, Using Editor.Windows OS, Features: File & director Management, Accessories.

SECTION - C

Introduction to Word processing:
Word processing concepts; General characteristics of Word Processing packages; using MSWORD, Editing and Formatting Features.

SECTION - D

Introduction to Spreadsheet:
Data Organisation concepts; using EXCEL including graphics facility. Mathematical and Statistical Functions; Absolute, Relative and Mixed Addressing.

References:

4. Harbraken, Joe : Learn MS-Office 2000 8 in 1, PHI.

Paper C : Practical Based on Paper – A.
SECOND SEMESTER

Course Title : FORTRAN Programming. Course Hrs : 90

Subsidiary Course is being offered to:
1. Zoology, M.Sc. (H.S) 1st year
2. Biophysics, M.Sc.(H.S) 1st year
3. Biochemistry M.Sc. (H.S.) 1st year
4. Microbiology, M.Sc. (H.S.) 1st year

Scheme of Examination:

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<th>Paper</th>
<th>Course</th>
<th>Exam hours</th>
<th>Theory/Practical Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paper B</td>
<td>FORTRAN Programming</td>
<td>3</td>
<td>80</td>
</tr>
<tr>
<td>Paper D</td>
<td>Practical Based on Paper B</td>
<td>3</td>
<td>20</td>
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</table>

Objectives: The course aims at familiarizing students with basics of FORTRAN Programming and Numerical Methods.

Paper B : FORTRAN Programming and Numerical Methods

Note:

i. The Question Paper will consist of five Sections A,B,C,D, and E comprising of total of NINE questions.

ii. Examiner will set TWO questions each in Sections A,B,C,D and ONE question in Section E. The Examiner will set 7-10 short answer type questions in Section C covering the whole syllabus.

iii. The students are required to attempt FIVE questions in all by selecting ONE question each from Section A,B,C,D and Section E is compulsory.

iv. All questions carry equal marks

SECTION - A

Problem solving on Computers using FORTRAN:
Concepts of algorithm and flow charting; features of FORTRAN Language - constants, variables, operators, expressions, control structures, arrays, subprograms & Sub-routines;

SECTION - B

Programming of statistical methods
Programming in FORTRAN for simple statistical methods (mean, standard deviation, regression line correlation); programming in FORTRAN for sorting, matrix multiplication.

SECTION - C

Numerical methods:
Computer Arithmetic; Bisection & Newton-Raphson Methods for solving algebraic equations;

SECTION - D


References:

3. RajaRaman, V., 2004 : Computer Programming in FORTRAN 90 & 95, PHI.

Paper D : Practical Based on Paper – B.