FACULTY OF SCIENCE

SYLLABI

FOR

COMPUTER SUBSIDIARY
FOR
B.Sc. (Hons. School)
for Mathematics & Physics Students
M.Sc. (Hons. School) 1st & 2nd Semester
for Biochemistry, Microbiology, Biophysics &
Zoology Students

EXAMINATIONS 2014-2015

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Syllabus for the session 2014 - 2015

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

<table>
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<tr>
<th>No.</th>
<th>Author</th>
<th>Title</th>
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</table>

Paper D: Practical Based on Paper - B.
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>Paper A: PC Software</th>
<th>Exam hours</th>
<th>Theory/Practical Marks</th>
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<tbody>
<tr>
<td>3</td>
<td>80</td>
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Paper C: Practical Based on Paper A
3  20

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

Paper A: PC Software

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 E 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; Type 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; Windows OS, Features: File & directory Management, Accessories. Types of DOS commands; Internal and External. - DIR, MD, CD, CLS, COPY, DATE, DEL, PATH, REN, RD, TIME, TYPE, VER, VOL External Commands: XCOPY, ATTRIB, BACKUP, RESTORE, FIND, SYS, FORMAT, CHKDSK, DISKCOPY, SCANDISK.

SECTION – C

Introduction to Word processing:
Word processing concepts; General characteristics of Word Processing packages; using MSWORD, Editing and Formatting Features. Word Processing Package: Basics of Word Processing; Word Processing Basics; Opening and Closing of documents; Text creation and Manipulation; Finding and replacing text, Printing of word document, Formatting of text; Margin setting, Adding Borders and shading, Adding Headers and Footers, Setting up
Multiple columns, Working with tables, Spell checking, Grammar facility. Retrieving often used text; Auto text character formatting, language setting and thesaurus; Mail merging.

**SECTION - D**

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

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.

**References :**

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**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>Description</th>
<th>Exam hours</th>
<th>Theory/Practical Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paper B</td>
<td>FORTRAN Programming and Numerical Methods</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>
</tr>
</tbody>
</table>

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

Paper B: FORTRAN Programming and Numerical Methods

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 E 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

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:

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Paper D: Practical Based on Paper – B.
M. Sc. (H.S.) First Year
Bio-physics
FIRST SEMESTER

Course No. BP – 45 : PC Software

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

Total Lectures : 70

Note:

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

vi. 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 E covering the whole syllabus.

vii. 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.

viii. All questions carry equal marks.

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

PC Software

SECTION – A
Introduction to Computers: General Model of Computer System; Brief description of various components of computer; Input / Output devices, Type 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 system; Windows OS, Features: File & directory Management, Accessories. Types of DOS commands; Internal and External. - DIR, MD, CD, CLS, COPY, DATE, DEL, PATH, REN, RD, TIME, TYPE, VER, VOL External Commands: XCOPY, ATTRIB, BACKUP, RESTORE, FIND, SYS, FORMAT, CHKDSK, DISKCOPY, SCANDISK.

SECTION – C
Word Processing Package: Basics of Word Processing; Word Processing Basics; Opening and Closing of documents; Text creation and Manipulation; Finding and replacing text, Printing of word document, Formatting of text; Margin setting, Adding Borders and shading, Adding Headers and Footers, Setting up Multiple columns, Working with tables, Spell check, Grammar facility, Retrieving often used text; Autotext character formatting, language setting and thesaurus; Mail merging.

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.
5. Taxali, R. K.: PC Software for Windows 98 made simple, Tata
M. Sc. (H.S.) First Year
Bio-physics
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 E 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 flowcharting; 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 equiprobability and independence elementary ideas about Markoff Chains and Ergodic processes – Redundancy concepts, applications to DNA and protein 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.

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