vBHARATHIAR UNIVERSITY, COIMBATORE.
M. Sc. BIOINFORMATICS DEGREE COURSE *(Affiliated Colleges)*
(Effective from the academic Year 2010-11)
SCHEME OF EXAMINATIONS – CBCS PATTERN

Sem.	Study Components	Course title	Ins. hrs/ week	Dur.Hr.	CIA	Marks	Total Marks	Credit
	Paper I	Fundamentals of biological systems	5	3	25	75	100	4
I	Paper II	Structure and functions of Biomolecules	5	3	25	75	100	4
	Paper III	Computer programming in C	5	3	25	75	100	4
	Paper IV	Computational methods for sequence analysis	5	3	25	75	100	4
	Practical I	Computer programming	3	-	-	-	-	-
	Practical II	Biological databanks and sequence analysis	3	-	-	-	-	-
	Elective	Paper I	4	3	25	75	100	4
II	Paper V	Molecular interaction	5	3	25	75	100	4
	Paper VI	Systems biology	5	3	25	75	100	4
	Paper VII	Introduction to Visual basic with RDBMS	5	3	25	75	100	4
	Paper VIII	Mathematical methods and statistical techniques	5	3	25	75	100	4
	Practical I	Computer programming	3	3	40	60	100	4
	Practical II	Biological databanks and sequence analysis	3	3	40	60	100	4
	Elective	Paper II	4	3	25	75	100	4
III	Paper IX	Genomics	5	3	25	75	100	4
	Paper X	Proteomics	5	3	25	75	100	4
	Paper XI	Molecular modeling and computer aided drug designing	5	3	25	75	100	4
	Paper XII	Perl Programming for Bioinformatics	5	3	25	75	100	4
	Practical III	Perl programming	3	-	-	-	-	-
	Practical IV	Computer aided drug design	3	-	-	-	-	-
	Elective	Paper III	2	3	25	75	100	4
	Elective	Paper IV Practical	2	-	-	-	-	-
IV	Practical III	Perl programming	-	3	40	60	100	4
	Practical IV	Computer aided drug design	-	3	40	60	100	4
	Elective	Elective Practical	-	6	40	60	100	4
	Project	Project work	-	-	-	-	250*	10
		Total					2250	90

* Project report - 200 marks; Viva-voce – 50 marks.

List of Group Elective papers (Colleges can choose any one of the Group papers as electives)

	GROUP A	GROUP B	GROUP C
Paper I/ Sem I	Biology of cloning vectors	Medicinal Chemistry	Proteomics
Paper II/ Sem II	Methods of gene transfer and genome sequencing	Pharmacogenomics-I	Struyctural Biology
Paper III/ Sem III	Applications of rDNA technology	Pharmacogenomics-II	Systems Biology
Paper IV/ Sem IV	Practical I - Molecular Techniques Practical II – rDNA Technology	Practical	Practical - Molecular Modeling and Drug Design.

Note :

1. The syllabus for the above papers (except Paper XII -Perl Programming for Bioinformatics, Group B & C Electives) be the same as prescribed for the academic year 2007-08. The existing Diploma papers are renamed as Group Elective papers.

2. The Syllabus for the Group B & C Elective papers the same as prescribed for the academic year 2009-10.

3. Practical III – Perl Programming : Prog. No.23 has been removed from the existing list.

4. The syllabus for the Paper XII - Perl Programming for Bioinformatics are furnished below.

Theory: PERL PROGRAMMING

Objectives

To enable the students to work with scripting and object oriented concepts with much more flexibility and easiness and with more readily available modules, which would enable them to develop good applications in Bioinformatics

UNIT – 1: Introduction to Perl

Scripting language. Interpreted Language. About Perl. Why Perl for Bioinformatics? CPAN. Basic structure of Perl language – *print* command – First Perl program – Executing your code.   Variables in Perl: Scalars, Arrays and Hashes. Package and Lexical Variables. Reading from the Keyboard – using *chomp*.

UNIT – 2: Data Structures in Perl

Literals: Numbers and Strings, Operators, Scalar data, Array data, Hash data. Manipulation of Data Structures: Scalar Variable: (Function list - chomp, chop, length, chr, oct, hex, oct, ord, index, rindex, substr, uc, ucfirst, lc, lcfirst). Array Variable: Creating an array, Use of range operator in an array, Adding and removing elements, getting the number of elements in an array, Accessing elements in an array. (Function list - reverse, sort, join, split, pop, push, shift, unshift, grep, map). Hash Variable: Printing hash data, accessing and removing elements (Function list - keys, values, delete, each, exists)

UNIT – 3: Control Structures and Regular Expressions

Control Structures: *if, else, elsif, switch, unless, while, until, do…while, for* and *for…each. (Statements associated with loops – next, last, redo, goto, continue)* Regular expressions: Simple string comparisons, Matching, Substitutions, and Translations. Special characters in patterns. Storing and reusing portions of patterns. Escape characters.

UNIT – 4: File and Directory Manipulations

File opening modes (read, write, append), File variable, Die – terminating a program, Reading a file line by line, Closing a file. File test operators (d, e, l, r, s, w, x, B, T). File

Manipulation Functions – select, eof, seek, tell, read, sysread, syswrite, link, unlink, rename, truncate. Directory Manipulation functions – mkdir, chdir, opendir, readdir, closedir, telldir, seekdir, rewinddir, rmdir. System variables.

UNIT – 5: Object Oriented Programming

Sub routines, references, OOPs in Perl – Introduction to modules, Classes in Perl, Methods, Constructors, Destructors, Inheritance, Polymorphism, Operator overloading. BioPerl – basics. CGI, DBI, LWP.

References

1. Rex A Dwyer, *Genomic PERL: From Bioinformatics Basics to Working Code*, Cambridge University Press, UK, 2003.

2. Michael Moorhouse and Paul Berry, *Bioinformatics, Biocomputing and PERL*, John Wiley and Sons Ltd., UK, 2004.

3. James Tisdall, *Beginning Perl for Bioinformatics*, O'Reilly & Associates, USA, 2001.

4. Harshawardhan P Bal, *Perl Programming for Bioinformatics*, Tata McGraw Hill Publishing Company Limited, 2003.

5. David Till and Kamran Husain, *Teach yourself Perl 5 in 21 days*, Sams Publishing, USA, 1996.

6. Scott Guelich, Shishir Gundavaram and Gunther Birznieks, *CGI Programming with Perl*, Second Edition, O'Reilly Media, USA, 2000.

7. Tim Bunce and Alligator Descartes, *Programming the Perl DBI*, O'Reilly Media, USA, 2000.

Web References

Tom's Object-Oriented Tutorial for Perl:

http://www.xav.com/perl/lib/Pod/perltoot.html

Perl Functions:

http://perldoc.perl.org/index-functions.html

http://www.perl.com/doc/manual/html/pod/perlfunc.html