Master of Science (Bioinformatics)

Programme Code: MSI

Duration – 2 Years Full Time

Programme Structure
And
Curriculum & Scheme of Examination

2010

AMITY UNIVERSITY UTTAR PRADESH
GAUTAM BUDDHA NAGAR
PREAMBLE

Amity University aims to achieve academic excellence by providing multi-faceted education to students and encourage them to reach the pinnacle of success. The University has designed a system that would provide rigorous academic programme with necessary skills to enable them to excel in their careers.

This booklet contains the Programme Structure, the Detailed Curriculum and the Scheme of Examination. The Programme Structure includes the courses (Core and Elective), arranged semester wise. The importance of each course is defined in terms of credits attached to it. The credit units attached to each course has been further defined in terms of contact hours i.e. Lecture Hours (L), Tutorial Hours (T), Practical Hours (P). Towards earning credits in terms of contact hours, 1 Lecture and 1 Tutorial per week are rated as 1 credit each and 2 Practical hours per week are rated as 1 credit. Thus, for example, an L-T-P structure of 3-0-0 will have 3 credits, 3-1-0 will have 4 credits, and 3-1-2 will have 5 credits.

The Curriculum and Scheme of Examination of each course includes the course objectives, course contents, scheme of examination and the list of text and references. The scheme of examination defines the various components of evaluation and the weightage attached to each component. The different codes used for the components of evaluation and the weightage attached to them are:

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<th>Components</th>
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It is hoped that it will help the students study in a planned and a structured manner and promote effective learning. Wishing you an intellectually stimulating stay at Amity University.

July, 2010
PROGRAMME OBJECTIVE

The M.Sc (Bioinformatics) programme explores the interface between two of the most dynamic subject areas—biology and computing. The sequencing of the first genome of a free-living organism moved biology irrevocably into the new data-rich era of bioinformatics. The availability of the blueprint of simple organisms and of humans has not of itself answered all our questions. Beyond the detail of connecting gene to function, what is missing is a clear model of how a single gene functions within a complex network to govern expression of the blueprint, an understanding of how the protein folds, a vision of how metabolic pathways and, in their turn, cells are integrated to deliver the features we commonly recognise in living cells. While much remains to be learned, the fundamental shift identified above would not have been possible without the power of modern information technology.

The storage, retrieval and analysis of vast quantities of sequence and structural data pose leading edge computational challenges. The course has a strong focus on hands-on experience of in-demand skills of the industry.
# PROGRAMME STRUCTURE

## FIRST SEMESTER

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**TOTAL** 29

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**TOTAL** 28

## SUMMER INTERNSHIP: 8 – 10WEEKS

## THIRD SEMESTER

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COMPUTERS IN BIOLOGY - I

Course Code: MSI 101
Credit Units: 03

Course Objective:
Bioinformatics is the science of making sense of biological information. The successful use of bioinformatics requires a thorough understanding of modern biochemistry and molecular biology as well as ability to use techniques of computer science, information technology and mathematics. The objective of this course is to make students well versed with use of a range of programming skills (Visual Basic, C++,) useful for writing bioinformatics software. They will gain experience of work in small groups and of linking together different types of program to form a software package.

Course Contents:

Module I
Basic Concepts of Hardware & Software, Overview of Programming Languages-Unstructured, Structured, Object oriented, Interpreted and compiled

Module II: OOPS concept with C++
Introduction to software programming
Introduction to SDLC
Basic of language
Data types, Control statements (loops and if)
Arrays (single and double)
Sorting and searching method in array (liner & Binary search, Bubble & selection Sort)
Functions (call by value, call by reference)
Pointes (pointer to functions, pointer to array, pointer to structure)
Structure
Object, class
Constructor and Destructors
Inheritance
Data encapsulation
Polymorphism
Virtual function and friend function

Module III: Introduction to Visual Programming with VB 6.0
Features of VB
Control statements
Creation of forms, Menu, tool bar
Database programming with Data control and ADO
Record filtration and sorting techniques With FLEX GRID control
Graphical representation of data with MS CHART CONTROL
MDI &SDI

Examination Scheme:

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<th>Components</th>
<th>CT</th>
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Text & References:

Text:
- Object Oriented programming C++, E. Bozagurusamy
- Visual Basic 6.0, Steven Holzner

References:
- Learning C++, Boardman
- Computer Fundamentals, Sinha
- Developing Bioinformatics Computer Skills, Cynthia Gibas, Per Jambeck, 2001
- The Wait Groups "C" Programming Using Turbo, Lafore
Course Objective:
The basic objective is to give students an introduction to the basic practical techniques of bioinformatics. Emphasis will be given to the application of bioinformatics and biological databases to problem solving in real research problems. The students will become familiar with the use of a wide variety of internet applications, biological database and will be able to apply these methods to research problems. They will also be able to write Perl scripts that perform analysis of nucleic acid and protein sequence data.

Course Contents:

Module I: Internet Technology & Web-based search Engine
Introduction to Internet, Computer, computer networks, World Wide Web, Internet; bits, bytes; Binary, octal, decimal, and Hexadecimal representation
Search Engines (Google, Yahoo, Entrez etc)
Transmission Characteristics-asynchronous and Synchronous transmission paths
Network Architectures (Topology, Layered protocols, Local Area Networks (LAN), Wide Area Networks (WAN), Network Components (Modems, Hubs, Repeaters, Bridges, Routers, Switches and Structured Cabling)
Network Management Systems

Module II: Biological Databases
Sequence databases (EMBL, GenBank, DDBJ, -UNIPROT, PIR, TrEMBL)
Protein family/domain databases (PROSITE, PRINTS, Pfam, BLOCK, etc)
Cluster databases-An Introduction
Specialised databases (KEGG, etc)
Database technologies (Flat-file)
Structural databases (PDB)

Module III: Introduction to PERL

Module IV: Introduction to Linux
Linux Installation
Basic shell commands
Basic shell programming
Working with VI editor

Examination Scheme:

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Text & References:

Text:
- Beginning Perl for Bioinformatics, James Tisdall
- Red Hat Linux, Negus
- Bioinformatics: Sequence, Structure and Databases: A Practical Approach (The Practical Approach Series, 236), Des Higgins (Editor), Willie Taylor

References:
- Bioinformatics: A Biologist's Guide to Biocomputing and the Internet, Stuart M. Brown
- Introduction to Bioinformatics, Teresa Attwood, David Parry-Smith
- Bioinformatics: Databases and Systems, Stanley Letovsky
- Networking for Dummies, Lowe, Doug
- All about computers for dummies, Gookin Dass
- Bioinformatics for Dummies
Course Objective:
The objective of this course is to make the students understand the types of statistical significance tests associated with bioinformatics programs; understand the theory behind various types of computational algorithms and be able to incorporate these in their own programs.

Course Contents:

BASIC MATHS

Module I: Number System
Integer, Real, Rational and Irrational

Set, Relation and Function
Set, Relations Functions (Polynomials, Trigonometric, Exponential)
Graphical Representation of Functions, Limits, Continuity

Module II
Matrices

Module III
Permutation and Combination

STATISTICS

Module I
Measure of Central Tendency, Measure of Dispersion & Measure of Skewness

Module II
Probability (Addition Theorem and Multiplication Theorem) Discrete Probability Distribution (Bernoulli, Binomial & Poisson), Continuous Probability Distribution: Normal

Module III
Central Limit Theorem and Weak Law of Large Numbers

Examination Scheme:

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Text & References:

Text:
- Fundamental Statistics, Gupta and Kapoor

References:
- Fundamental of Biostatistics, Bernard Rosner
- Mathematical Statistics, H.C. Saxena and Kapoor
- Primer of Biostatistics, Stanton A. Glantz
- Investigating Biological System using Modeling: Strategies and Software, Meryl E. Wastney
- Basic Biostatistics: Concepts for health Science, Frank D. Bell
Course Objective:
The understanding of cell biology and immunology are important for analyzing and deciphering the biological information. The objective of this course is to provide the basics of cell biology, including the structure, function and biogenesis of cellular organelles and to examine cellular and molecular aspects of the immune system.

Course Contents:

CELL BIOLOGY

Module I
Introduction to prokaryotic & eukaryotic cellular systems

Module II

Module III

Module IV
Chromosomes - Structure function and chemical composition organization – nucleosomes.

Module V
Cell Division – Mitosis and Meiosis, Chromosomal events during meiosis – crossing over, Non-disjunction, chromosomal abnormality, linkage and mapping.
Types of inheritance

IMMUNOLOGY

Module VI: Overview of Immune system
Humoral cell mediated immune response
Immunoglobulins – structure and function

Module VII
Production of monoclonal antibodies, Gene rearrangement and antibody diversity
Cell mediated Immunity, Histocompatibility -MHC class I, II and III, Epitopes

Module VIII
Immune response to Infectious diseases-Flu, influenza, Vaccines – different types, vaccine strategies, DNA Vaccines

Examination Scheme:

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Text & References:

Text:
- Immunology, Fifth Edition, Richard A. Goldsby, Thomas J. Kindt, Janis Kuby, Barbara A. Osborne

References:
- Essential Cell Biology, 2nd Edition, Bruce Alberts
- Fundamental Immunology, William E. Paul
Course Objective:
The physical and chemical principles underlying biological processes will be discussed. Emphasis will be on metabolic pathways, regulatory pathway and genetic disorders, which are essential in understanding the physiological processes.

Course Contents:

Module I: Metabolic Pathways & Networks
Glycolysis, Kreb’s cycle, Electron transport system and oxidative phosphorylation, Gluconeogenesis, Pentose phosphate pathway, Glycogen metabolism – synthesis and metabolism, Regulation of carbohydrate metabolism.

Module II: Amino acid Metabolism
Reductive amination and Transamination, detoxification of ammonia – Ornithine cycle

Module III: Fats and Lipid
Fatty acid metabolism

Module IV: Photosynthesis
Light reaction and generation of NADPH and ATP, Dark reaction – carbon dioxide fixation.

Module V: Metabolic errors
Albinism, phenyl ketonuria, alkaptonuria, tay-sachs disease.

Examination Scheme:

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</table>

Text & References:

Text:

• Biochemistry, Donald Voet, Judith G. Voet

References:

• Biochemistry (4th edition), Lubert Stryer
• Lehninger Principles of Biochemistry, Albert L. Lehninger, David L. Nelson, Michael M. Cox
• Lippincott's Illustrated Reviews: Biochemistry, Pamela C. Champe, Richard A. Harvey, Denise R. Ferrier, Ph.D.
COMPUTATIONAL PROTEOMICS

Course Code: MSI 106  Credit Units: 03

Course Objective:
The broad objective of this course is to describe basic principles of protein structure including protein structure motifs, properties of alpha helices and beta sheets and protein folding. The aim is to explain to the students how a protein’s conformation determines its biochemical activity, how a protein’s structure enables binding to other molecules and how a protein’s function can be deduced from its primary structure. It describes the techniques used for solving the 3-D structure of a protein and for analysis of proteome.

Course Contents:

Module I
Amino acids: Structure, Classification, chemical and physical properties
Peptides and polypeptides, protein

Module II: Principles of Protein structure
Primary, secondary, tertiary and quaternary structure of protein
Molecular forces involved in the determination of secondary, tertiary and quaternary structure. Conformational properties of proteins, Ramachandran plot.

Module III: Protein structure determination
X-ray diffraction technique: Basic principles of X-Ray diffraction technique, phase determination, calculation of Electron Density map, Interpretation of the electron density map.
NMR spectroscopy-Basic principles and Application in Proteomics
Analysis of the X-ray and NMR data using web based tools.

Module IV
Mass spectrometry – Principle, instrumentation and application in Proteomics,
2D-GEL electrophoresis: Principle, method, Analysis of Gel image, Applications.
Web Tools used for analysis of Mass spectra and 2D-Gel Images

Module V: Classification of three-dimensional structures of proteins –
Prediction of structural classes, motifs, folds and domains; HSSP, SCOP, FSSP and CATH.

Module VI
Protein – Protein Interactions: Methods & Tools; Protein-DNA Interactions: Methods & Tools

Examination Scheme:

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</table>

Text & References:

Text:
- Introduction to Protein Structure, Carl-Ivar Branden, John Tooze

References:
- Principles of Protein structure, Schultz, G. E., and Schirmer, R. H
- Proteomics, Daniel C. Leibler
- Proteins: Structures and Molecular Principles (2d ed.), TE Creighton
- Organic spectroscopy, William Kemp
- Proteome Research: Two-Dimensional Gel Electrophoresis and Detection Methods (Principles and Practice), T. Rabilloud (Editor), 2000, Springer Verlag
COMPUTERS IN BIOLOGY LAB - I

Course Code: MSI 120      Credit Units: 02

Course Contents:

Module I
Control Statement in C++, Functions: call by value and call by reference, Array: Single and Double dimensional, Sorting: Selection, Bubble, insertion, Merge Sort, Searching: Leaner and Binary Search, Pointes (pointer to functions, pointer to array, pointer to structure), Structure, Object, class, Constructor and Destructors, Inheritance, operator overload (+,++,--,--) and function overloading Virtual function and friend function.

Module II
Control statements, Creation of: forms, Menu, tool bar, progress bar, modules, Database programming with Data control and ADO (Add, delete, update, filter records), Display and filter the records into FLEX GRID control using the DAO and ADO, Packaging and Deployment of the Project. Control Array, Graphical representation of data with MS CHART CONTROL. MDI form creation.

Examination Scheme:

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COMPUTATIONAL BIOLOGY LAB - I

Course Code: MSI 121 Credit Units: 02

Course Contents:

Module I
Different types of search engines & important site.

Module II
Referencing in Scientific literature and their practical usage, PubMed

Module III
Biological Databases: Study of different Biological databases (esp. the ones given below), Format, their distinguishing features, Uses and Applications.
1. Sequence databases: EMBL, DDBJ, GenBank, Uniprot, PIR, TrembL
2. Domain database: Prosie, PRINT, Pfam, BLOCK
3. Cluster database/Database Technologies
4. Structure database: PDB
5. Specialised database: KEGG, PUBMED, OMIM

Module IV
Working with Basic Linux Commands for file and Directory, Paste, Grep, cut, diff, sort, etc. Shell programming control Statement, file handling. Creation of files with the vi editor.

Module V
Programming with PERL

Examination Scheme:

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The examination of Basics of Computer System and Programming Practical will be held out of 100 marks during end term examination.
BIOCHEMISTRY LAB

Course Code: MSI 122 Credit Units: 01

Course Contents:

1. Identification of proteins
2. Separation & quantitation of proteins
3. Biochemical estimation of DNA & RNA
4. Separation of DNA on Agrose gel.
5. Paper chromatography of amino acids, plant pigment

Examination Scheme:

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Course Code: MSI 123  
Credit Units: 01

Course Contents:
The coursework for this practical session will follow the theory syllabus.

Module I
Determination of Physico-chemical Properties of peptides/proteins

Module II
Translation of Nucleic acid sequence to protein sequence  
Determination of Open Reading Frames

Module III
Analysis of Peptide/protein fragment using Mass Spectra data  
2D-Gel image analysis

Module IV
Visualisation and analysis of 3D-structures of Proteins and protein-ligand interactions using graphics tool.

Module V
Identification of an unknown sequence and Determination of its secondary structure and function  
Prediction of structural classes, motifs, folds and domains:, SCOP, FSSP and CATH.  
DALI Algorithm

Examination Scheme:

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The examination of Basics of Computer System and Programming Practical will be held out of 100 marks during end term examination.
A term (or research) paper is primarily a record of intelligent reading in several sources on a particular subject. The students will choose the topic at the beginning of the session in consultation with the faculty assigned. The progress of the paper will be monitored regularly by the faculty. At the end of the semester the detailed paper on the topic will be submitted to the faculty assigned. The evaluation will be done by Board of examiners comprising of the faculties.

GUIDELINES FOR TERM PAPER
The procedure for writing a term paper may consist of the following steps:
1. Choosing a subject
2. Finding sources of materials
3. Collecting the notes
4. Outlining the paper
5. Writing the first draft
6. Editing & preparing the final paper

1. Choosing a Subject
The subject chosen should not be too general.

2. Finding Sources of materials
   a) The material sources should be not more than 10 years old unless the nature of the paper is such that it involves examining older writings from a historical point of view.
   b) Begin by making a list of subject-headings under which you might expect the subject to be listed.
   c) The sources could be books and magazine articles, news stories, periodicals, scientific journals etc.

3. Collecting the notes
   Skim through sources, locating the useful material, then make good notes of it, including quotes and information for footnotes.
   a) Get facts, not just opinions. Compare the facts with author's conclusion.
   b) In research studies, notice the methods and procedures, results & conclusions.
   c) Check cross references.

4. Outlining the paper
   a) Review notes to find main sub-divisions of the subject.
   b) Sort the collected material again under each main division to find sub-sections for outline so that it begins to look more coherent and takes on a definite structure. If it does not, try going back and sorting again for main divisions, to see if another general pattern is possible.

5. Writing the first draft
   Write the paper around the outline, being sure that you indicate in the first part of the paper what its purpose is.
   You may follow the following:
   a) Statement of purpose
   b) Main body of the paper
   c) Statement of summary and conclusion
   Avoid short, bumpy sentences and long straggling sentences with more than one main idea.

6. Editing & Preparing the final Paper
   a) Before writing a term paper, you should ensure you have a question which you attempt to answer in your paper. This question should be kept in mind throughout the paper. Include only information/ details/ analyses of relevance to the question at hand. Sometimes, the relevance of a particular section may be clear to you but not to your readers. To avoid this, ensure you briefly explain the relevance of every section.
   b) Read the paper to ensure that the language is not awkward, and that it "flows" properly.
   c) Check for proper spelling, phrasing and sentence construction.
   d) Check for proper form on footnotes, quotes, and punctuation.
   e) Check to see that quotations serve one of the following purposes:
      (i) Show evidence of what an author has said.
      (ii) Avoid misrepresentation through restatement.
      (iii) Save unnecessary writing when ideas have been well expressed by the original author.
   f) Check for proper form on tables and graphs. Be certain that any table or graph is self-explanatory.
   Term papers should be composed of the following sections:
Generally, the introduction, discussion, conclusion and bibliography part should account for a third of the paper and the review part should be two thirds of the paper.

**Discussion**
The discussion section either follows the results or may alternatively be integrated in the results section. The section should consist of a discussion of the results of the study focusing on the question posed in the research paper.

**Conclusion**
The conclusion is often thought of as the easiest part of the paper but should by no means be disregarded. There are a number of key components which should not be omitted. These include:
- **a)** summary of question posed
- **b)** summary of findings
- **c)** summary of main limitations of the study at hand
- **d)** details of possibilities for related future research

**Reference**
From the very beginning of a research project, you should be careful to note all details of articles gathered. The bibliography should contain ALL references included in the paper. References not included in the text in any form should NOT be included in the bibliography. The key to a good bibliography is consistency. Choose a particular convention and stick to this.

**Conventions**

Monographs

Edited volumes
[(eds.) is used when there is more than one editor; and (ed.) where there is only one editor. In German the abbreviation used is (Hrsg.) for Herausgeber].

Edited articles

Journal articles

Electronic book

Electronic journal articles

Other websites

Unpublished papers
Unpublished theses/ dissertations

Appendix
The appendix should be used for data collected (e.g. questionnaires, transcripts, ...) and for tables and graphs not included in the main text due to their subsidiary nature or to space constraints in the main text.

Assessment Scheme:

Continuous Evaluation: 40%
(Based on abstract writing, interim draft, general approach, research orientation, readings undertaken etc.)

Final Evaluation: 60%
(Based on the organization of the paper, objectives/problem profile/issue outlining, comprehensiveness of the research, flow of the idea/ideas, relevance of material used/presented, outcomes vs. objectives, presentation/viva etc.)
COMMUNICATION SKILLS – I

Course Code: MSI 141      Credit Units: 01

Course Objective:
The Course is designed to give an overview of the four broad categories of English Communication thereby enhance the learners’ communicative competence.

Course Contents:

Module I: Listening Skills
Effective Listening: Principles and Barriers
Listening Comprehension on International Standards

Module II: Speaking Skills
Pronunciation and Accent
Reading excerpts from news dailies & magazines
Narrating Incident; Story telling.
Extempore & Role Plays

Module III: Reading Skills
Vocabulary: Synonyms, antonyms, diminutives, homonyms, homophones
Idioms & phrases
Foreign words in English

Module IV: Writing Skills
Writing Paragraphs
Précis Writing
Letter writing
Coherence and structure
Essay writing

Module V: Activities
News reading
Picture reading
Movie magic
Announcements

Examination Scheme:

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<th>Components</th>
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<th>CT2</th>
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CAF – Communication Assessment File
GD – Group Discussion
GP – Group Presentation

Text & References:

- Working in English, Jones, Cambridge
- Business Communication, Raman – Prakash, Oxford
- Speaking Personally, Porter-Ladousse, Cambridge
- Speaking Effectively, Jermy Comfort, et.al, Cambridge
Course Objective:
This course aims at imparting an understanding of:
Self and the process of self exploration
Learning strategies for development of a healthy self esteem
Importance of attitudes and their effect on work behaviour
Effective management of emotions and building interpersonal competence.

Course Contents:

Module I: Understanding Self
Formation of self concept
Dimension of Self
Components of self
Self Competency

Module II: Self-Esteem: Sense of Worth
Meaning and Nature of Self Esteem
Characteristics of High and Low Self Esteem
Importance & need of Self Esteem
Self Esteem at work
Steps to enhance Self Esteem

Module III: Emotional Intelligence: Brain Power
Introduction to EI
Difference between IQ, EQ and SQ
Relevance of EI at workplace
Self assessment, analysis and action plan

Module IV: Managing Emotions and Building Interpersonal Competence
Need and importance of Emotions
Healthy and Unhealthy expression of emotions
Anger: Conceptualization and Cycle
Developing emotional and interpersonal competence
Self assessment, analysis and action plan

Module V: Leading Through Positive Attitude
Understanding Attitudes
Formation of Attitudes
Types of Attitudes
Effects of Attitude on Behaviour
Perception
Motivation
Stress
Adjustment
Time Management
Effective Performance
Building Positive Attitude

Module VI: End-of-Semester Appraisal
Viva based on personal journal
Assessment of Behavioural change as a result of training
Exit Level Rating by Self and Observer

Text & References:

- Towers, Marc: Self Esteem, 1st Edition 1997, American Media
• Covey, R. Stephen: Seven habits of Highly Effective People, 1992 Edition, Simon & Schuster Ltd.
• Dr. Dinkmeyer Don, Dr. Losoney Lewis, The Skills of Encouragement: St. Lucie Press.
Course Code: MSI 144      Credit Units: 02

Course Objective:
To familiarize the students with the French language
• with the phonetic system
• with the syntax
• with the manners
• with the cultural aspects

Course Contents:

Module A: pp. 01 to 37: Unités 1, 2, Unité 3 Objectif 1, 2
Only grammar of Unité 3: objectif 3, 4 and 5

Contenu lexical: Unité 1: Découvrir la langue française : (oral et écrit)
1. se présenter, présenter quelqu’un, faire la connaissance des autres, formules de politesse, rencontres
2. dire/interroger si on comprend
3. Nommer les choses

Unité 2: Faire connaissance
1. donner/demander des informations sur une personne, premiers contacts, exprimer ses goûts et ses préférences
2. Parler de soi: parler du travail, de ses activités, de son pays, de sa ville.

Unité 3: Organiser son temps
1. dire la date et l’heure

Contenu grammatical: 1. organisation générale de la grammaire
2. article indéfini, défini, contracté
3. nom, adjectif, masculin, féminin, singulier et pluriel
4. négation avec « de », "moi aussi", "moi non plus"
5. interrogation : Inversion, est-ce que, qui, que, quoi, qu’est-ce que, où, quand, comment, quel(s), quelle(s)
   Interro-négatif : réponses : oui, si, non
6. pronom tonique/disjoint- pour insister après une préposition
7. futur proche

Examination Scheme:

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C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:
• le livre à suivre : Campus: Tome 1
Course Objective:
To enable the students to converse, read and write in the language with the help of the basic rules of grammar, which will later help them to strengthen their language.
To give the students an insight into the culture, geography, political situation and economic opportunities available in Germany.

Course Contents:

Module I: Introduction
Self introduction: heissen, kommen, wohnen, lernen, arbeiten, trinken, etc.
All personal pronouns in relation to the verbs taught so far.
Greetings: Guten Morgen!, Guten Tag!, Guten Abend!, Gute Nacht!, Danke sehr!, Danke!, Vielen Dank!, (es tut mir Leid!),
Hallo, wie geht’s?: Danke gut!, sehr gut!, prima!, ausgezeichnet!,
Es geht!, nicht so gut!, so la la!, miserabel!

Module II: Interviewspiel
To assimilate the vocabulary learnt so far and to apply the words and phrases in short dialogues in an interview – game for self introduction.

Module III: Phonetics
Sound system of the language with special stress on Diphthongs

Module IV: Countries, nationalities and their languages
To make the students acquainted with the most widely used country names, their nationalitie and the language spoken in that country.

Module V: Articles
The definite and indefinite articles in masculine, feminine and neuter gender. All Vegetables, Fruits, Animals, Furniture, Eatables, modes of Transport

Module VI: Professions
To acquaint the students with professions in both the genders with the help of the verb “sein”.

Module VII: Pronouns
Simple possessive pronouns, the use of my, your, etc.
The family members, family Tree with the help of the verb “to have”

Module VIII: Colours
All the color and color related vocabulary – colored, colorful, colorless, pale, light, dark, etc.

Module IX: Numbers and calculations – verb “kosten”
The counting, plural structures and simple calculation like addition, subtraction, multiplication and division to test the knowledge of numbers.
“Wie viel kostet das?”

Module X: Revision list of Question pronouns
W – Questions like who, what, where, when, which, how, how many, how much, etc.

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C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- Wolfgang Hieber, Lernziel Deutsch
- Hans-Heinrich Wangler, Sprachkurs Deutsch
- Schulz Griesbach, Deutsche Sprachlehre für Ausländer
- P.L Aneja, Deutsch Interessant - 1, 2 & 3
- Rosa-Maria Dallapiazza et al, Tangram Aktuell A1/1,2
- Braun, Nieder, Schmöe, Deutsch als Fremdsprache 1A, Grundkurs
SPANISH – I

Course Code: MSI 146       Credit Units: 02

Course Objective:
To enable students acquire the relevance of the Spanish language in today’s global context, how to greet each other. How to present / introduce each other using basic verbs and vocabulary

Course Contents:

Module I
A brief history of Spain, Latin America, the language, the culture…and the relevance of Spanish language in today’s global context.
Introduction to alphabets

Module II
Introduction to ‘Saludos’ (How to greet each other. How to present / introduce each other).
Goodbyes (despedidas)
The verb llamarse and practice of it.

Module III
Concept of Gender and Number
Months of the years, days of the week, seasons. Introduction to numbers 1-100, Colors, Revision of numbers and introduction to ordinal numbers.

Module IV
Introduction to SER and ESTAR (both of which mean to be). Revision of ‘Saludos’ and ‘Llamarse’. Some adjectives, nationalities, professions, physical/geographical location, the fact that Spanish adjectives have to agree with gender and number of their nouns. Exercises highlighting usage of Ser and Estar.

Module V
Time, demonstrative pronoun (Este/esta, Aquel/aquella etc)

Module VI
Introduction to some key AR/ER/IR ending regular verbs.

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C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- Español, En Directo I A
- Español Sin Fronteras
Course Code: MSI 147  Credit Units: 02

Course Objective:
To enable the students to learn the basic rules of grammar and Japanese language to be used in daily life that will later help them to strengthen their language.

Course Contents:

Module I: Salutations
Self introduction, Asking and answering to small general questions

Module II: Cardinal Numbers
Numerals, Expression of time and period, Days, months

Module III: Tenses
Present Tense, Future tense

Module IV: Prepositions
Particles, possession, Forming questions

Module V: Demonstratives
Interrogatives, pronoun and adjectives

Module VI: Description
Common phrases, Adjectives to describe a person

Module VII: Schedule
Time Table, everyday routine etc.

Module VIII: Outings
Going to see a movie, party, friend’s house etc.

Learning Outcome
➢ Students can speak the basic language describing above mentioned topics

Methods of Private study /Self help
➢ Handouts, audio-aids, and self-do assignments and role-plays will support classroom teaching

Examination Scheme:

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<th>Components</th>
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C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

Text:
➢ Teach yourself Japanese

References:
➢ Shin Nihongo no kiso 1
Course Objective:
There are many dialects spoken in China, but the language which will help you through wherever you go is Mandarin, or Putonghua, as it is called in Chinese. The most widely spoken forms of Chinese are Mandarin, Cantonese, Gan, Hakka, Min, Wu and Xiang. The course aims at familiarizing the student with the basic aspects of speaking ability of Mandarin, the language of Mainland China. The course aims at training students in practical skills and nurturing them to interact with a Chinese person.

Course Contents:

Module I
Show pictures, dialogue and retell.
Getting to know each other.
Practicing chart with Initials and Finals. (CHART – The Chinese Phonetic Alphabet Called “Hanyu Pinyin” in Mandarin Chinese.)
Practicing of Tones as it is a tonal language.
Changes in 3rd tone and Neutral Tone.

Module II
Greetings
Let me Introduce
The modal particle “ne”.
Use of Please ‘qing” – sit, have tea ………… etc.
A brief self introduction – Ni hao ma? Zaijian!
Use of “bu” negative.

Module III
Attributives showing possession
How is your Health? Thank you
Where are you from?
A few Professions like – Engineer, Businessman, Doctor, Teacher, Worker.
Are you busy with your work?
May I know your name?

Module IV
Use of “How many” – People in your family?
Use of “zhe” and “na”.
Use of interrogative particle “shenme”, “shui”, “ma” and “nar”.
How to make interrogative sentences ending with “ma”.
Structural particle “de”.
Use of “Nin” when and where to use and with whom. Use of guixing.
Use of verb “zuo” and how to make sentences with it.

Module V
Family structure and Relations.
Use of “you” – “mei you”.
Measure words
Days and Weekdays.
Numbers.
Maps, different languages and Countries.

Examination Scheme:

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</table>

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

• “Elementary Chinese Reader Part I” Lesson 1-10
MOLECULAR BIOLOGY

Course Code: MSI 201 Credit Units: 03

Course Objective:
The course mainly concerns with the understanding of the interactions between the various systems of a cell, including the interrelationship of DNA, RNA and protein synthesis and learning how these interactions are regulated. It also provides an introduction to the concepts and applications of genetic engineering.

Course Contents:

Module I: Basic Molecular Biology
Basic idea about DNA, RNA and protein. Structure of A, B and Z forms of DNA Structure and function of mRNA, rRNA and tRNA

Module II: DNA Replication
DNA replication in prokaryotes, rolling circle model, semi conservative replication, origin of replication fork. Enzymes involved in replication, DNA proof reading and DNA repair mechanism.

Module III: Central Dogma of molecular Biology
DNA transcription and translation. Comparison between prokaryotic and eukaryotic systems.

Module IV: Regulation of Gene Expression
Operon concept, Induction and repression, negative control, lac operon, translational attenuation-tryptophan operon, Arabinose operon. Contrast between gene regulation of prokaryotes and eukaryotes

Module V: Genetic Engineering
Definition and fundamental concepts, Restriction endonucleases and ligases, Peparation of desired DNA fragments, cDNA synthesis, Types of vectors-plasmids, phages and cosmids. cDNA library, genomic DNA library, cloning of DNA in host, Expression host, shuttle vectors, suicidal vectors. Selection of clones, Blotting techniques-Southern, Western and Northern blots.

Module VI: Selection strategies

Examination Scheme:

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</table>

Text & References:

Text:
- Molecular Cell Biology, Lodish ABS, and Baltimore H.

References:
- Molecular Biology of the Cell, Alberts Bruce, Bray Demos and Watson James.
- Concepts of Genetics, Klug WS, and Cummins MR
- Genes VIII, Lewin Bejamin.
- Principles of Gene manipulation, Primrose SB, Twyman SB and Old RW.
- From Genes to Clones, Winnacker EL.
COMPUTERS IN BIOLOGY - II

Course Code: MSI 202  Credit Units: 03

Course Objective:
The objective of this course is to describe relational data models and database management systems with an emphasis on answering biologically important questions; teaches the theories and techniques of constructing relational databases to store various biological data, including sequences, structures, genetic linkages and maps, and signal pathways. The students would be given an in depth knowledge of HTML.

Course Contents:

Module I: Algorithm Design
Flow Charts

Module II
HTML

Module III
Oracle9i Database
Basics of Databases
Database Systems – Definition - Data abstraction and data models - Instances and schemas, Issues in Database Administration-, Data Definition and manipulation languages-network and hierarchical models

PART A: SQL (STRUCTURED QUERY LANGUAGE)

Introduction to RDBMS: Dr. Codes Rules, Relations, Attributes, Tuples, Normalisation

Introduction to SQL: Select statement, arithmetic operators, column heading defaults, concate operator, duplicate rows, intracting with script files

DML, DDL, DCL statements: (Select statement with order by, Like operators, where clause, Group by Clause, Rollup, Cube, Having Clause), Creating of Tables, Deleting the rows, update the rows, Alter the table, Inserting Rows into the Tables

Constraints: Not Null, Primary Key, Foreign Key, Check, Unique, Dropping the Constraints, Disabling and enabling the constraints, Viewing the constraints.

Functions in SQL: Character function, Functions, Group Functions, date and time functions, Functions to work with the NULL values, Decode function, Number Function

Displaying the data from Multiple Tables using Joins: Equi Join, Self Join, Outer Join

Sub Queries: Guidelines For using the sub queries, Type of Sub queries Sub queries using with ANY, ALL, EXISTS Operators, Handling the Null Values in the sub queries, Correlated Queries

Reports Generation with SQL: Column command, break commands, compute, Title, Btitle, Generating Script file for Reports

Creating Views: Simple View and Complex Views, Retrieving Querying and Modifying a View Guideline To Create a View.

Other Database object: Sequences, Guidline to Modify the Sequences, Creation of Indexes, Creating of Synonyms

Set Operators: UNION, UNION ALL, INTERSECT, MINUS OPERATORS

Part B: PL/SQL

Introduction to PL/SQL
Programming Construct of PL/SQL Blocks: Different Part of PL/SQL Blocks, If Statement, nested if, Loops (While, for)

Writing Simple PL/SQL Block: Database Manipulations With select Statements, Updating, deleting and Insert the records Through PL/SQL Programs

Cursors: Implicit And Explicit cursor, Cursor For Loops, Different Attribute of the cursor.

Function And Procedures: Writing Pl/sql Block using Function and procedures, Calling Function with in a function, roping function and Procedures, Alter function and Procedures

Triggers: Creating Triggers on Insert, update and delete events, instead of triggers, dropping triggers.

Packages: Creation of package specification and pack age body,

PL/SQL Tables: Handling the PL/SQL block with PL/SQL tables Using the Array Concept

Part C: SQL FORMS 6i AND SQL REPORTS

SQL Forms 6i: Creation of data blocks and control blocks, creation of form,canvas,Program Units ,Visual Attributes,Master detail forms, Alerts, Writing form level and block level triggers,lovs,Menu, Calling reports into forms, menu builder

SQL REPORTS 6i: Creation of Different type of Reports (Form like, Tabular report, group above and group left reports, matrix and group matrix reports,

Examination Scheme:

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</table>

Text & References:

Text:
- SQL, PL/ SQL: The programming languages of Oracle, Bayross Iyan

References:
- Oracle developer 2000 Form6i , BayRoss Ivan
- Learning HTML, Robbins C.
- Oracle SQL, Kreines David C
- Oracle 9i:The complete reference, Loney Kevin, Koch G
Course Objective:
The main objective of this course is to enable students to make meaningful interpretations of the biological data using statistical methods.

Course Contents:

Module I: Sampling Distributions
Probability Distributions, Expectation, Variance and Moments
Statistic, parameter, Distribution of sample mean, sample proportion. Application of Central limit theorem.

Module II: Estimation Theory
Biased and unbiased estimator, Confidence interval: population mean and proportion.

Module III: Maximum Likelihood Estimation
Discrete and Continuous distributions, Likelihood function (use of package recommended).

Module IV: Inference- Tests of hypotheses
Formulation of Hypothesis Simple and Composite, Type I and Type II errors Power of a test, Significance of a test, P-value Testing, Z, t-test and F-test
Chi-square (all applications), Non-parametric: Wilcoxon test

Module V: Simple Linear Regression and Correlation
Karl Pearson Correlation and Spearman’s Rank Correlation, Linear regression model, Least squares methods, Estimating model parameters, Residual sum of squares

Module VI: Applied Regression Analysis
Multivariate regression analysis, outliers, co-linearity, Confounding and Interaction in regression

Examination Scheme:

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Text & References:

Text:

References:
- Hoel, Port and Stone, Introduction to Statistics
COMPUTATIONAL BIOLOGY - II

Course Code: MSI 204      Credit Units: 02

Course Objective:
The course, which is divided into several modules, is designed to introduce data mining and its related elements to the students. In striving to achieve this objective, the course uses besides others, lectures on various important aspects like Graph theory, different algorithms etc. It will also focus on the analysis of genomic and proteomic data and their interpretation. Significance of BioLinux in bioinformatics will be dealt with.

Course Contents:

Module I: Analysis of DNA and protein sequences
Distribution frequency statistics, pattern, motif, block, profile, searches using some related databases

Module II
Sequences - protein and DNA, Multiple Sequence Alignment,

Module III
Pair wise Alignment - Scoring matrices – PAM and BLOSUM series, Local and Global alignment – Algorithms, DOT matrix analysis, Heuristic alignment algorithm-BLAST & FASTA, Statistics Behind algorithms & Scores, Databases search for homologous sequence using (BLAST) and (FASTA)

Module IV: Data Mining
Concept of Data warehouse, Knowledge discovery process, Need of Data mining in bioinformatics
Data mining Tasks - Model Building & Pattern Detection, Various components of Data Mining algorithms, Online Analytical Processing (OLAP) & various types
Data Management-Memory hierarchy, different database systems, query languages, Data Mining process and its different stages – Data gathering, data cleansing, data analyzing etc.,

Module V: Bio Linux
Introduction to Bio-Linux
Introduction to Linux using Bio-Linux
Bioinformatics software on Bio-Linux

Examination Scheme:

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</table>

Text & References:

Text:
- Bioinformatics: Sequence and Genome Analysis, David W. Mount.
- Data Mining: Multimedia, Soft Computing, and Bioinformatics, Mitra, Sushmita Acharya, Tinku

References:
- Introduction to Bioinformatics, Teresa Attwood, David Parry-Smith.
- Current Topics in Computational Molecular Biology (Computational Molecular Biology), Tao Jiang, Ying Xu, Michael Zhang (Editors),
- Introduction to Bioinformatics Algorithms, Neil C. Jones, Pavel Pevzner
- Linux Bible, Christopher Negus
- Linux command, Bryan Pfaffem Berger
BIOINFORMATICS ALGORITHMS

Course Code: MSI 205      Credit Units: 03

Course Objective:
The principal objectives of the course are to cover the major algorithms used in bioinformatics: sequence alignment, multiple sequence alignment, phylogeny; classifying patterns in sequences; secondary structure prediction; 3D structure prediction; analysis of gene expression data. This includes dynamic programming, machine learning, simulated annealing, and clustering algorithms. Algorithmic principles will be emphasized.

Course Contents:

Module I: Algorithms & complexity
Introduction
Recursion
Searching
Sorting

Module II
Data types and data structures, Classes and objects, Complexity of algorithms: worst case, average case, and amortized complexity. Algorithm analysis. Algorithm Design Paradigms

Module III
Introduction to Graph Theory
Various terminologies: Vertex, Edge, Arc, Ends, Order, Neighbourhood, Degree, Loop, Circuit, Chromatic no., Size, Path, Chain, Connected components, Tree, Forest, Distance, Walk, Trail, Length
Different type of graphs: Simple, Connected, Sub-, Di-, Oriented, Complete, Multi-, Pseudo-, Trivial, Null-, Weighted, Regular, Finite, Infinite, Empty, Bi-, Complete bi-, Isomorphic, Network Eulerian and Hamiltonian cycle
Modes of representation of graphs – Adjacency matrix, Adjacency List
Graph traversals – BFS, DFS
Dijkstra’s algorithm, Kruskal's algorithm & Prim's algorithm

Module IV
Visualization - Visualization Techniques, Visualization Framework, Perspectives for visual representations, Visualization Model
ANN (Artificial Neural Network)

Module V
Dynamic programming methodology (Needleman and Wunsch algorithm, Smith waterman algorithm)

Module VI
Algorithm –
Classes of algorithm,
Components of Data Mining algorithms,
Considerations for choosing optimal algorithm for a data mining problem-
Model/Pattern Structure, Score Function, Search Methods, Data Management Strategy etc.
String Matching Algorithms

Examination Scheme:

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Text & References:

Text:
• Introduction to Bioinformatics Algorithms, Neil C. Jones, Pavel Pevzner
References:

- Fundamental Concepts of Bioinformatics, Dan E. Krane Michael L. Raymer
- Data Mining: Multimedia, Soft Computing, and Bioinformatics, Mitra, Sushmita Acharya, Tinku
- Statistical Methods in Bioinformatics: An Introduction (Statistics for Biology and Health), Warren Ewens, Gregory Grant,
- Bioinformatics: Managing Scientific Data, Zoe Lacroix, Terence Critchlow
- Algorithms on Strings, Trees, and Sequences: Computer Science and Computational Biology, Dan Gusfield
MOLECULAR MODELING AND DRUG DESIGN

Course Code: MSI 206  Credit Units: 02

Course Objective:
Molecular modeling and computer graphics are powerful tools in the study of the relationships between molecular structure and biological activity, and thus essential in the process of rational drug design. Molecular modeling has become an indispensable part of modern medicinal chemistry and during the last decade the methods have been implemented in most pharmaceutical companies. Different methods of drug designing will be discussed.

Course Contents:

Module I: Molecular Modeling
Basic principles of theoretical modeling, Empirical forcefields for biomolecular simulations, Energy minimization, Molecular dynamics, Monte Carlo simulation

Module II: Drug Designing
Introduction to drug discovery process, Strategies for drug design, Target identification and validation techniques, Brief overview of pharmacokinetics.
Building Biological Molecules, Conformational Search Techniques,

Module III: Protein Structure Prediction Methods
Secondary Structure: Chou-Fasman method, Garnier Osguthorpe Robson (GOR), Neural Network based methods; Tertiary Structure; Threading techniques; Homology Modeling and Abinitio methods

Module IV: Structure Based Drug Design
Target Structure Based Drug Design (Active site identification, Characterization of target site, etc.), Denovo methods, Docking techniques

Module V: Analogue based drug design
QSAR (Quantitative Structural Activity Relationship) -2D QSAR, 3D QSAR

Examination Scheme:

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Text & References:

Text:
- Molecular modeling: Principles and Applications, A. Leach

References:
- Guide book on Molecular Modeling in Drug design, Cohen N. Claude
MOLECULAR BIOLOGY LAB

Course Code: MSI 220     Credit Units: 01

Course Contents:

- Induction of mutagenesis in microbe, fungi and eukaryotic cells.
- Isolation of plasmid DNA and chromosomal DNA
- Restriction digestion of DNA
- Ligation
- Preparation of competent cells.
- Transformation of competent cells by CaCl₂ method.

Examination Scheme:

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The examination of Basics of Computer System and Programming Practical will be held out of 100 marks during end term examination.
COMPUTERS IN BIOLOGY LAB - II

Course Code: MSI 221
Credit Units: 01

Course Objective:
This session will enable the students to practically apply their knowledge gained from their paper Computers in Biology - II

Course Contents:

Module I
Html tags: bold, italic, underline, unordered and ordered list. Tables, hyperlinks, Image Insertion, marquee, image mapping, frame set, HTML forms etc.

Module II
SQL statements: Create table, insert, delete update, applying constraints on the tables, Functions: Date, Character, aggregate, select statement with order by, group by, having keywords Joins: Equi, Inner and outer join, Working with the Sub queries, Keyword Any, ALL, Exists, Views: creation, update, top N Analysis, generating of SQL statements using concatenation of SQL statements, SQL reports (Single and Break). Sequences, Clusters. User management (Create user, alter user, roles, privileges)

Module III
PL/SQL programming: control statements, function, procedures, package, database Triggers, PL/SQL tables.

Module IV
Introduction to Oracle Forms 6i (Modules, canvases, Data block, Master detail Forms. LOVs, Menu creations, Alerts, Insert update and delete records via forms Reports creations, calling reports from forms.

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The examination of Basics of Computer System and Programming Practical will be held out of 100 marks during end term examination.
**COMPUTATIONAL BIOLOGY LAB - II**

Course Code: MSI 222      Credit Units: 01

**Course Contents:**

**Module I**
Basics of Sequence analysis
Retrieving a sequence-nucleic acid/Protein

**Module II**
Local and Global Alignment- Concepts
Pair wise sequence alignment
Multiple sequence alignment
Analysis Using Scoring Matrice

**Module III**
Dot Matrix Analysis

**Module IV**
Bio Linux

**Examination Scheme:**

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The examination of Basics of Computer System and Programming Practical will be held out of 100 marks during end term examination.
BIOINFORMATICS ALGORITHMS LAB

Course Code: MSI 223 Credit Units: 01

Course Contents:

Module I
Pseudo codes of ANN and HMM and their application in bioinformatics.

Module II
Pseudo codes and Perl Programming on Smith Watermann Algorithm, Needleman Wunsch Algorithm

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The examination of Basics of Computer System and Programming Practical will be held out of 100 marks during end term examination.
**Course Contents:**
The coursework for the practical session will follow the theory syllabus.

**Module I**
Building Biological Molecules,
Conformational Search Techniques,
Energy minimization, simulation

**Module II: Target Structure Based Drug Design**
Active site identification,
Characterization of target site,
Docking
Analysis

**QSAR (Quantitative Structural Activity Relationship)**
2D QSAR, 3D QSAR;
Analysis

**Examination Scheme:**

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The examination of Basics of Computer System and Programming Practical will be held out of 100 marks during end term examination.
A term (or research) paper is primarily a record of intelligent reading in several sources on a particular subject. The students will choose the topic at the beginning of the session in consultation with the faculty assigned. The progress of the paper will be monitored regularly by the faculty. At the end of the semester the detailed paper on the topic will be submitted to the faculty assigned. The evaluation will be done by Board of examiners comprising of the faculties.

GUIDELINES FOR TERM PAPER
The procedure for writing a term paper may consist of the following steps:
1. Choosing a subject
2. Finding sources of materials
3. Collecting the notes
4. Outlining the paper
5. Writing the first draft
6. Editing & preparing the final paper

1. Choosing a Subject
The subject chosen should not be too general.

2. Finding Sources of materials
   a) The material sources should be not more than 10 years old unless the nature of the paper is such that it involves examining older writings from a historical point of view.
   b) Begin by making a list of subject-headings under which you might expect the subject to be listed.
   c) The sources could be books and magazine articles, news stories, periodicals, scientific journals etc.

3. Collecting the notes
   Skim through sources, locating the useful material, then make good notes of it, including quotes and information for footnotes.
   a) Get facts, not just opinions. Compare the facts with author's conclusion.
   b) In research studies, notice the methods and procedures, results & conclusions.
   c) Check cross references.

4. Outlining the paper
   a) Review notes to find main sub-divisions of the subject.
   b) Sort the collected material again under each main division to find sub-sections for outline so that it begins to look more coherent and takes on a definite structure. If it does not, try going back and sorting again for main divisions, to see if another general pattern is possible.

5. Writing the first draft
   Write the paper around the outline, being sure that you indicate in the first part of the paper what its purpose is. You may follow the following:
   a) statement of purpose
   b) main body of the paper
   c) statement of summary and conclusion
   Avoid short, bumpy sentences and long straggling sentences with more than one main idea.

6. Editing & Preparing the final Paper
   a) Before writing a term paper, you should ensure you have a question which you attempt to answer in your paper. This question should be kept in mind throughout the paper. Include only information/ details/ analyses of relevance to the question at hand. Sometimes, the relevance of a particular section may be clear to you but not to your readers. To avoid this, ensure you briefly explain the relevance of every section.
   b) Read the paper to ensure that the language is not awkward, and that it "flows" properly.
   c) Check for proper spelling, phrasing and sentence construction.
   d) Check for proper form on footnotes, quotes, and punctuation.
   e) Check to see that quotations serve one of the following purposes:
      i. Show evidence of what an author has said.
      ii. Avoid misrepresentation through restatement.
      iii. Save unnecessary writing when ideas have been well expressed by the original author.
   f) Check for proper form on tables and graphs. Be certain that any table or graph is self-explanatory.
   Term papers should be composed of the following sections:
Generally, the introduction, discussion, conclusion and bibliography part should account for a third of the paper and the review part should be two thirds of the paper.

Discussion
The discussion section either follows the results or may alternatively be integrated in the results section. The section should consist of a discussion of the results of the study focusing on the question posed in the research paper.

Conclusion
The conclusion is often thought of as the easiest part of the paper but should by no means be disregarded. There are a number of key components which should not be omitted. These include:
e) summary of question posed 
f) summary of findings 
g) summary of main limitations of the study at hand 
h) details of possibilities for related future research

Reference
From the very beginning of a research project, you should be careful to note all details of articles gathered. The bibliography should contain ALL references included in the paper. References not included in the text in any form should NOT be included in the bibliography. The key to a good bibliography is consistency. Choose a particular convention and stick to this.

Conventions
Monographs

Edited volumes
[(eds.) is used when there is more than one editor; and (ed.) where there is only one editor. In German the abbreviation used is (Hrsg.) for Herausgeber].

Edited articles

Journal articles

Electronic book

Electronic journal articles

Other websites

Unpublished papers
Unpublished theses/ dissertations

Appendix
The appendix should be used for data collected (e.g. questionnaires, transcripts, ...) and for tables and graphs not included in the main text due to their subsidiary nature or to space constraints in the main text.

Assessment Scheme:

Continuous Evaluation 40%
(Based on abstract writing, interim draft, general approach, research orientation, readings undertaken etc.)

Final Evaluation 60%
(Based on the organization of the paper, objectives/ problem profile/ issue outlining, comprehensiveness of the research, flow of the idea/ ideas, relevance of material used/ presented, outcomes vs. objectives, presentation/ viva etc.)
COMMUNICATION SKILLS - II

Course Code: MSI 241      Credit Units: 01

Course Objective:
To enrich the understanding of English language and communication, structure, style, usage, and vocabulary for global business purposes.

Course Contents:

Module I: Fundamentals of Communication
Role and purpose of communication: 7 C’s of communication
Barriers to effective communication
Enhancing listening
Forms of Communication: one-to-one, informal and formal

Module II: Verbal Communication (Written)
Business Letter
Social correspondence
Writing resume and Job applications

Module III: Speaking skills
Conversational English
Guidelines to give an effective presentation
Activities to include:
Presentations by students
Just a minute

Examination Scheme:

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<th>Components</th>
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</table>

CAF – Communication Assessment File
GD – Group Discussion
GP – Group Presentation

Text & References:

- Business Communication, Raman – Prakash, Oxford
- Text: of Business Communication, Ramaswami S, Macmillan
- Speaking Personally, Porter - Ladousse, Cambridge
BEHAVIOURAL SCIENCE - II
(BEHAVIOURAL COMMUNICATION AND RELATIONSHIP MANAGEMENT)

Course Code: MSI 243  
Credit Units: 01

Course Objective:
This course aims at imparting an understanding of:
Process of Behavioural communication
Aspects of interpersonal communication and relationship
Management of individual differences as important dimension of IPR

Course Contents:

Module I: Behavioural Communication
Scope of Behavioural Communication
Process – Personal, Impersonal and Interpersonal Communication
Guidelines for developing Human Communication skills
Relevance of Behavioural Communication in relationship management

Module II: Managing Individual Differences in Relationships
Principles
Types of issues
Approaches
Understanding and importance of self disclosure
Guidelines for effective communication during conflicts

Module III: Communication Climate: Foundation of Interpersonal Relationships
Elements of satisfying relationships
Conforming and Disconfirming Communication
Culturally Relevant Communication
Guideline for Creating and Sustaining Healthy Climate

Module IV: Interpersonal Communication
Imperatives for Interpersonal Communication
Models – Linear, Interaction and Transaction
Patterns – Complementary, Symmetrical and Parallel
Types – Self and Other Oriented
Steps to improve Interpersonal Communication

Module V: Interpersonal Relationship Development
Relationship circle – Peer/ Colleague, Superior and Subordinate
Initiating and establishing IPR
Escalating, maintaining and terminating IPR
Direct and indirect strategies of terminating relationship
Model of ending relationship

Module VI: End-of-Semester Appraisal
Viva based on personal journal
Assessment of Behavioural change as a result of training
Exit Level Rating by Self and Observer

Text & References:

- Julia T. Wood. Interpersonal Communication everyday encounter
- Harvard Business School, Effective Communication: United States of America
- Beebe, Beebe and Redmond; Interpersonal Communication, 1996; Allyn and Bacon Publishers.
Course Objective:
- To enable the students to overcome the fear of speaking a foreign language and take position as a foreigner speaking French.
- To make them learn the basic rules of French Grammar.

Course Contents:

Module A: pp.38 – 47: Unité 3 : Objectif 3, 4, 5, 6
Module B: pp. 47 to 75 Unité 4, 5

Contenu lexical: Unité 3: Organiser son temps
1. donner/demander des informations sur un emploi du temps, un horaire
   SNCF – Imaginer un dialogue
2. rédiger un message/ une lettre pour …
   i) prendre un rendez-vous/ accepter et confirmer/ annuler
   ii) inviter/accepter/refuser
3. Faire un programme d’activités
   i) imaginer une conversation téléphonique/un dialogue
   ii) Propositions- interroger, répondre

Unité 4: Découvrir son environnement
1. situer un lieu
2. s’orienter, s’informer sur un itinéraire.
3. Chercher, décrire un logement
4. connaître les rythmes de la vie

Unité 5: s'informer
1. demander/donner des informations sur un emploi du temps passé.
2. donner une explication, exprimer le doute ou la certitude.
3. découvrir les relations entre les mots
4. savoir s'informer

Contenu grammatical:
1. Adjectifs démonstratifs
2. Adjectifs possessifs/exprimer la possession à l’aide de:
   i. « de » ii. A+nom/pronom disjoint
3. Conjugaison pronominale – négative, interrogative - construction à l'infinitif
4. Impératif/exprimer l’obligation/l’interdiction à l’aide de « il faut…. »/ «il ne faut pas… »
5. passé composé
6. Questions directes/indirectes

Examination Scheme:

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C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:
- le livre à suivre : Campus: Tome 1
Course Code: MSI 245 Credit Units: 02

Course Objective:
To enable the students to converse, read and write in the language with the help of the basic rules of grammar, which will later help them to strengthen their language.
To give the students an insight into the culture, geography, political situation and economic opportunities available in Germany
Introduction to Grammar to consolidate the language base learnt in Semester I

Course Contents:

Module I: Everything about Time and Time periods
Time and times of the day.
Weekdays, months, seasons.
Adverbs of time and time related prepositions

Module II: Irregular verbs
Introduction to irregular verbs like to be, and others, to learn the conjugations of the same, (fahren, essen, lessen, schlafen, sprechen und ähnliche).

Module III: Separable verbs
To comprehend the change in meaning that the verbs undergo when used as such
Treatment of such verbs with separable prefixes

Module IV: Reading and comprehension
Reading and deciphering railway schedules/school time table
Usage of separable verbs in the above context

Module V: Accusative case
Accusative case with the relevant articles
Introduction to 2 different kinds of sentences – Nominative and Accusative

Module VI: Accusative personal pronouns
Nominative and accusative in comparison
Emphasizing on the universal applicability of the pronouns to both persons and objects

Module VII: Accusative prepositions
Accusative propositions with their use
Both theoretical and figurative use

Module VIII: Dialogues
Dialogue reading: ‘In the market place’
‘At the Hotel’

Examination Scheme:

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C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- Wolfgang Hieber, Lernziel Deutsch
- Hans-Heinrich Wangler, Sprachkurs Deutsch
- Schulz Griesbach, Deutsche Sprachlehre für Ausländer
- P.L Aneja, Deutsch Interessant- 1, 2 & 3
- Rosa-Maria Dallapiazza et al, Tangram Aktuell A1/1,2
- Braun, Nieder, Schmöe, Deutsch als Fremdsprache 1A, Grundkurs
SPANISH – II

Course Code: MSI 246 Credit Units: 02

Course Objective:
To enable students acquire more vocabulary, grammar, Verbal Phrases to understand simple texts and start describing any person or object in Simple Present Tense.

Course Contents:

Module I
Revision of earlier modules.

Module II
Some more AR/ER/IR verbs. Introduction to root changing and irregular AR/ER/IR ending verbs.

Module III
More verbal phrases (eg, Dios Mio, Que lastima etc), adverbs (bueno/malo, muy, mucho, bastante, poco). Simple texts based on grammar and vocabulary done in earlier modules.

Module IV
Possessive pronouns

Module V
Writing/speaking essays like my friend, my house, my school/institution, myself….descriptions of people, objects etc, computer/internet related vocabulary

Examination Scheme:

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C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- Español, En Directo I A
- Español Sin Fronteras
Course Objective:
To enable the students to converse in the language with the help of basic particles and be able to define the situations and people using different adjectives.

Course Contents:

Module I: Verbs
Transitive verbs, intransitive verbs

Module II: More prepositions
More particles, articles and likes and dislikes.

Module III: Terms used for instructions
No parking, no smoking etc.

Module IV: Adverbs
Different adverbial expression.

Module V: Invitations and celebrations
Giving and receiving presents,
Inviting somebody for lunch, dinner, movie and how to accept and refuse in different ways

Module VI: Comprehension’s
Short essay on Family, Friend etc.

Module VII: Conversations
Situational conversations like asking the way, At a post office, family

Module VIII: Illness
Going to the doctor, hospital etc.

Learning Outcome
➢ Students can speak the language describing above-mentioned topics.

Methods of Private study /Self help
➢ Handouts, audio-aids, and self-do assignments.
➢ Use of library, visiting and watching movies in Japan and culture center every Friday at 6pm.

Examination Scheme:

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C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

Text:
➢ Teach yourself Japanese

References:
➢ Shin Nihongo no kiso 1
Course Objective:
Chinese is a tonal language where each syllable in isolation has its definite tone (flat, falling, rising and rising/falling), and same syllables with different tones mean different things. When you say, “ma” with a third tone, it mean horse and “ma” with the first tone is Mother. The course aims at familiarizing the student with the basic aspects of speaking ability of Mandarin, the language of Mainland China. The course aims at training students in practical skills and nurturing them to interact with a Chinese person.

Course Contents:

Module I
Drills
Practice reading aloud
Observe Picture and answer the question.
Tone practice.
Practice using the language both by speaking and by taking notes.
Introduction of basic sentence patterns.
Measure words.
Glad to meet you.

Module II
Where do you live?
Learning different colors.
Tones of “bu”
Buying things and how much it costs?
Dialogue on change of Money.
More sentence patterns on Days and Weekdays.
How to tell time. Saying the units of time in Chinese. Learning to say useful phrases like – 8:00, 11:25, 10:30 P.M. everyday, afternoon, evening, night, morning 3:58, one hour, to begin, to end …. etc.
Morning, Afternoon, Evening, Night.

Module III
Use of words of location like-li, wais hang, xia
Furniture – table, chair, bed, bookshelf... etc.
Description of room, house or hostel room.. eg what is placed where and how many things are there in it?
Review Lessons – Preview Lessons.
Expression “yao”, “xiang” and “yaoshi” (if).
Days of week, months in a year etc.
I am learning Chinese. Is Chinese difficult?

Module IV
Counting from 1-1000
Use of “chang-chang”.
Making an Inquiry – What time is it now? Where is the Post Office?
Days of the week. Months in a year.
Use of Preposition – “zai”, “gen”.
Use of interrogative pronoun – “duoshao” and “ji”.
“Whose”???, Sweater etc is it?
Different Games and going out for exercise in the morning.

Module V
The verb “qu”
Going to the library issuing a book from the library
Going to the cinema hall, buying tickets
Going to the post office, buying stamps
Going to the market to buy things.. etc
Going to the buy clothes …. Etc.
Hobby. I also like swimming.
Comprehension and answer questions based on it.
Examination Scheme:

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C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- “Elementary Chinese Reader Part I” Lesson 11-20
JAVA

Course Code: MSI 301      Credit Units: 04

Course Objective:
The objective is to introduce students to a modern programming language and help them gain sufficient fluency to undertake research projects with a programming component; to lay the foundations for more advanced study of object-oriented languages. Emphasis is on to understand the basic concepts of programming; to learn the syntax and semantics of Java; to be able to use a program development environment; to become familiar with some fundamental algorithms and data structures.

Course Contents:

Module I
Introduction to Java - Features, Inheritance, Packages, Interfaces; Multi- Threading, Applet Programming: AWT- Components, Layout, etc., Event Handling, Java Packages - java.lang, - java.util, -java.io; Basics of Java Beans

Module II
JDBC
Introduction to Client Server Application
Java Drivers
java.sql Package
Executing SQL Statements

Module III
Java Servlets
Introduction to Server Side Application Development
Basics of Servlet Programming
Web Container
Session Tracking
Servlet Context

Examination Scheme:

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Text & References:

Text:
- The Complete Reference JAVA 2: 5th. ed. By Schildt Herbert

References:
- Core Java: Advanced Features, Horstmann
- Java Servlet Programming Hunter J, Crauford
- Java Server Programming J2EE edition Allamaraju, et.al.
WINDOW APPLICATIONS USING .NET

Course Code: MSI 302  Credit Units: 04

Course Objective:
The objective of this course is to make students well versed with concept and implementation of .NET technology into different type of application

Course Contents:

Module I
Introduction to Visual Basic .NET and .NET framework, Variables and Constants
Programming Constructs, Implement Arrays, Object – oriented features of Visual Basic.NET, Option statement, Typecasting, procedures and functions, delegates, Implement classes in VB.NET, events handling,

Module II
Properties, Polymorphism, Inheritance, Implement Method Overriding, Interfaces, Multithreading, collection, Implement error handling

Module III
ADO.NET architecture, components of ADO.NET, Command and Connection Objects
Transactions in ADO.NET, use of Dataset, Data Adapter and Data Reader object
Use the Data Grid Control; List the properties and methods of the Data Grid Control
Data Bind in Data Grid, Insert, Update and Delete data in Data Grid Control

Module IV
MDI and SDI applications, Menu Control, Dynamic Menu, Image List Control
Tool Bar and Status Bar Controls, Use the Timer Control, Tree View Control, List View Control

Module V
Crystal Reports (Type of crystal report, Crystal Report Viewer, Work with Crystal Report Expert), Bind Crystal Reports to Windows Forms applications, Help class and its Components, Packaging and Deploying concepts, Package Resources, various deployment alternatives

Examination Scheme:

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Text & References:

Text:
- Programming Visual Basic.NET 2003, Jesse Liberty and Orelly

References:
- Mastering VB .net , BPB Publications
- Visual basic .net Black book by Dreamtech Steven HolZner
- VB .NET complete, BPB publication
- Visual Basic Step by Step, Microsoft
Course Objective:
This Clinical Data Management course provides an introduction of clinical data management processes. It explains the regulations impacting clinical data management, describe the framework for clinical data management operations, describe the different processes involved in the set up of clinical data management, including database, data validation, edit checks and required data management documentation.

Course Contents:

Module I: Fundamentals of clinical trials
Fundamental principles of comparative clinical trials in investigating effectiveness, efficacy and safety of treatments, benefits of clinical trials in comparison to alternative study designs, Main features of clinical trials, Key decisions surrounding design (including sample size), delivery and assessment of clinical trials.

Module II
Basic statistics for clinical trials, How to select and apply appropriate statistical methods to analyse data from clinical trials, presenting, interpreting and discussing the analyses clearly and concisely.

Module III: Clinical Research Protocol development & Scientific writing
Key steps in implementing a clinical trial ,clarifying and operationalising the primary and secondary objectives of clinical trials, the implications of design choices for implementation of a trial, trial governance, clearances and data collection and recruitment methods. Quality assurance and control, data processing, management issues including post-trial monitoring.
Reporting and reviewing clinical trials Protocol development. Steps to be taken for preparing the protocol for a trial, including data collection forms, logistical and budgetary issues, and procedures of different funding bodies.

Module IV: Trial designs
Use of different trial designs such as non-inferiority and equivalence, cross-over, factorial, multi-armed and cluster randomised trials

Module V
Data monitoring and interim analyses

Examination Scheme:

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Text & References:

Text:
- Clinical Data Management Richard K. Rondel (Editor), Sheila A. Varley (Editor), Colin F. Webb (Editor)

References:
- Practical Guide to Clinical Data Management by Susanne Prokscha
- Design and Analysis of Clinical Trials : Concepts and Methodologies (Wiley Series in Probability and Statistics)by: Shein-Chung Chow, Jen-Pei Liu
CHEMINFORMATICS AND PHARMACOINFORMATICS

Course Code: MSI 304  Credit Units: 03

Course Objective:
The objective of this course is to provide comprehensive understanding of the fast growing cheminformatics & pharmacoinformatics field in science and technology starting from basic principles to the point of application in various fields of chemistry, biotechnology and drug development.

Course Contents:

Module I
Introduction to Cheminformatics & Pharmacoinformatics, Use of Cheminformatics & Pharmacoinformatics, Prospectus of Cheminformatics

Module II: Modern Combinatorial Chemistry & Chemical Information Sources
Chemical Literature, Chemical Information Searches, Chemical Information Sources, Chemical Name and Formula Searching, Analytical Chemistry (Constitutional Chemistry), Chemical History, Biography, Directories, and Industry Sources

Module III: Cheminformatics Database Design & their Management

Module IV: Pharmacoinformatics
Contour of Drugs, Development of New Drugs, chemical & physiochemical parameters in Drug design, Design of enzyme inhibitors, Pharmacokinetics & Drug Metabolism, Biological Testing and Bioassays, Preclinical Testing and Clinical Trial, Applications and Tools

Examination Scheme:

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Text & References:

Text:
• An Introduction to Chemoinformatics - Andrew R. Leach, Valerie J. Gillet

References:
• Chemoinformatics in Drug Discovery (Methods and Principles in Medicinal Chemistry) - by Mannhold, Raimund, Wiley-VCH Verlag publication
• Chemoinformatics: A Text: - by Johann Gasteiger, Thomas Engel
• Basic Cheminformatics: A Text: - By Mercato Inglese
MICROARRAY TECHNOLOGIES

Course Code: MSI 305 Credit Units: 03

Course Objective:
The broad objectives of this course are to explain the relevance of microarray technology in genomics. Emphasis is on how different kinds of microarrays are fabricated, how microarray experiments are performed, how microarrays are scanned, and how the fluorescent output is analyzed to generate quantitative data. It will also explain to the students how bioinformatics is used in microarray data analysis and how microarrays are currently used.

Course Contents:

Module I: Technology

Module II: Case Studies

Module III: Algorithms and techniques for Microarray analysis
Introduction to Bayesian statistics, Introduction to discrimination or classification concept. Microarray Data, Preprocessing the Data, Measuring Dissimilarity of expression pattern, Distance and dissimilarity measures, Visualizing microarray data, Principal Component analysis, PCA and Microarray Data Cluster Analysis and Microarray Data-means Clustering, Hierarchical Clustering, Self Organizing Maps (SOM), Identifying genes: Expressed usually in a sample, Expressed significantly in population, Expressed differently in two populations.

Module IV: Advanced analysis
Introduction to Support Vector Machines and their applications, Introduction to Neural Networks, Classifying Samples from two populations using Multilayer Perceptron, Using genetic algorithm and perceptron for feature selection and supervised classification.

Module V: Web Resources of Microarray Technology and Gene Expression
Expression Profiler

Examination Scheme:

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Text & References:

Text:
- Microarrays for an Integrative Genomics (Computational Molecular Biology), Isaac S. Kohane, Alvin Kho, Atul J. Butte

References:
- Bioinformatics: The Machine Learning Approach by Pierre Baldi, Soren Brunak, Sren Brunak
Course Objective:
The objective is to describe how molecular data can be used to construct a phylogenetic tree and characterize the rates and causes of nucleotide substitutions. The aim is also to explain how a gene/protein family arises and the mechanisms, which underlie evolution at the molecular level.
The purpose of the course is to provide an overview of the many facets of the exciting field of computational biology by bringing together various aspects of a number of biological and mathematical sciences. It is primarily a skills course. Participants will develop mathematical models to solve biological questions. This course explores advanced Perl programming applications for biologists.

Course Contents:

Module I: Fragment assembly
Genome sequence assembly, Gene finding methods (Gene Builder, GENE SCAN, GENSCAN, GRAIL II, Gene Mark, Gene Mark, Mc Promoter Etc), Fourier series and Fourier Transforms, Application of Fourier transforms (Gene predictions)

Module II: Molecular Evolution and Phylogeny
Biological foundation and phylogenetic models, Terminology- homology, homoplasy, orthology and paralogy; Methodologies-Clustering method, Rooted and Unrooted Tree representation, Boot strapping strategies.

Module III: Bioperl

Examination Scheme:

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Text & References:

Text:
- Mastering Perl for Bioinformatics, James D. Tisdall

References:
- Computational Modeling of Genetic and Biochemical Networks, Bower & Bolouri
- Calculations for Molecular biology & biotechnology, Frank H. Stephenson
- Bioinformatics: Sequence and Genome Analysis, David W. Mount
- Foundations of Systems Biology, Hiroaki Kitano
- Genomic Regulatory Systems: Development and Evolution, Eric H. Davidson,
- Genes & Signals, Mark Ptashe, Alexander Gann, Computational Modeling of Genetic and Biochemical Networks (Computational Molecular Biology), James M. Bower and Hamid
- Protein-Protein Interactions: A Molecular Cloning Manual, Erica Golemis
- Computational Analysis of Biochemical Systems: A Practical Guide for Biochemists and Molecular Biologists, Eberhard O. Voit,
COMPUTATIONAL GENOMICS AND R

Course Code: MSI 307      Credit Units: 02

Course Objective:
The objective is to explain the structure, function, replication and evolution of eukaryotic genomes. Emphasis will be on current gene expression profiling techniques, different tools for analysis of human genomes. This course will impart to the students the current techniques and methodologies in the fields of comparative and functional genomics.

Course Contents:

Module I: Human genome project
Tools for analysis of human genome, Alternative-splicing models, Probing with EST's, Exon micro array, Implication in cancer genetics.

Module II: Analysis and Annotation
Genome assembly, Features identification and genome annotation.

Module III: Analysis of Regulatory Regions
Characteristics of regulatory regions, TF sites, Organisation of regulatory regions, General signals to be detected, Methods for detection of regulatory regions, General principle for detection.

Module IV: R
Introduction and preliminaries of R, Simple manipulations; numbers and vectors, Objects, their modes and attributes, Ordered and unordered factors, Arrays and matrices, Lists and data frames, Reading data from files, Probability distributions, Grouping, loops and conditional execution, Writing your own functions, Statistical models in R, Graphical procedures, Packages.

Module V: BioConductor
Introduction to BioConductor, BioConductor packages from genomics, installing and maintaining bioConductor, BioConductor Packages. Importation and QC, exprSets, filtering, data analysis options, annotation, GO/pathways/graphs.

Examination Scheme:

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<th>Attendance</th>
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</table>

Text & References:

Text:
- Introduction to Computational Molecular Biology, Joao Meidanis, Joao C. Setabal.

References:
- Handbook of Comparative Genomics: Principles and Methodology, Cecilia Saccone, Graxiano Pesole.
- Comparative Genomics, Melody Clark.
- Bioinformatics and Computational Biology Solutions using R and Bioconductor edited by Robert Gentleman, Vincent Carey, Wolfgang Huber, Rafael Irizarry, Sandrine Dudoit.
- Cartoon Guide to Genetics by Larry Gonick.
JAVA LAB

Course Code: MSI 320      Credit Units: 02

Course Contents:

Module I
Control statements, Inheritance, Packages, Interfaces; Multi-Threading, Applet Programming: AWT-Components, Layout, etc., Event Handling, Java Packages - java.util, -java.io;

Module II
JDBC: Development of java programs to insert, update and delete records from a Database like (Oracles Server or MS –Access), Retrieval of records from the database.

Examination Scheme:

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The examination of Basics of Computer System and Programming Practical will be held out of 100 marks during end term examination.
WINDOW APPLICATION USING .NET LAB

Course Code:  MSI 321  Credit Units: 02

Course Contents:
The coursework for the practical session will follow the theory syllabus

Module I
Implementation of function, procedures, delegates, classes in events handling in vb .net.

Module II
Implementation of Polymorphism, Inheritance, Method Overriding, Interfaces, Multithreading, collection, error handling in VB.Net

Module III
Database handling using ADO.NET, Insert Update, delete and retrieval of data using ADO .Net.

Module IV
Creation of MDI and SDI applications, Menu Control, Dynamic Menu, Image List Control Tool Bar and Status Bar Controls, Use the Timer Control, Tree View Control, List View Control

Module V
Creation of Crystal Reports (Type of crystal report, Crystal Report Viewer, Work with Crystal Report Expert) Bind Crystal Reports to Windows Forms applications, Help class and its Components, Packaging and Deploying concepts, Package Resources, various deployment alternatives

Examination Scheme:

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The examination of Basics of Computer System and Programming Practical will be held out of 100 marks during end term examination.
CLINICAL DATA MANAGEMENT LAB

Course Code: MSI 322      Credit Units: 02

Course Contents:
The coursework for the practical session will follow the theory syllabus.

Module I
Data collection from referral centers regarding occurrence, remedial measurements and therapeutic usage relating to few tropical diseases.

Module II
Formation of case study report.

Module III
Evaluation and Interpretation of Report

Examination Scheme:

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The examination of Basics of Computer System and Programming Practical will be held out of 100 marks during end term examination.
Course Contents:
The coursework for the practical session will follow the theory syllabus.

Module I
Chemical structures databases-use of MedChem, ChemFinder, Searching databases using variety of query formats like CAS registry etc.

Module II
3-Structure building and geometry optimization

Module III
Chemical structure representation in Text string-SMILES

Module IV
Structure Activity relationship-QSAR

Module V
Identification of probable binding sites for ligand by calculating steric constraints and bond energies

Module VI
Calculation of ADME properties for drug candidates.

Examination Scheme:

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The examination of Basics of Computer System and Programming Practical will be held out of 100 marks during end term examination.
MICROARRAY TECHNOLOGIES LAB

Course Code: MSI 324      Credit Units: 01

Course Contents:
The coursework for the practical session will follow the theory syllabus.

Module I
Target Identification

Module II
Data Validation

Module III
Analysis of microarray data

Module IV
Web Resources of Micro array Technology and Gene Expression chains and their applications

Examination Scheme:

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The examination of Basics of Computer System and Programming Practical will be held out of 100 marks during end term examination.
Course Contents:
The coursework for the practical session will follow the theory syllabus.

Module I
Gene finding methods - GENE SCAN, GENSCAN, GRAIL II etc
Gene predictions

Module II: Phylogenetic trees
Clustering method, Rooted and Unrooted Tree representation, Boot strapping strategies. PhyloDraw, MEGA, PHYLIP, PAUP, TreeView

Module III
BioPerl

Examination Scheme:

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The examination of Basics of Computer System and Programming Practical will be held out of 100 marks during end term examination.
Course Code: MSI 326      Credit Units: 02

Course Contents:
The coursework for the practical session will follow the theory syllabus.

Module I
Gene expression profiling

Module II
Tools for analysis of human genome, Alternative-splicing models, Probing with EST's.

Module III
Genome annotation

Module IV: Analysis of Regulatory Regions
General signals to be detected, detection of regulatory regions, Promoter Prediction

Examination Scheme:

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The examination of Basics of Computer System and Programming Practical will be held out of 100 marks during end term examination.
TERM PAPER - III

Course Code: MSI 330 Credit Units: 03

A term (or research) paper is primarily a record of intelligent reading in several sources on a particular subject. The students will choose the topic at the beginning of the session in consultation with the faculty assigned. The progress of the paper will be monitored regularly by the faculty. At the end of the semester the detailed paper on the topic will be submitted to the faculty assigned. The evaluation will be done by Board of examiners comprising of the faculties.

GUIDELINES FOR TERM PAPER
The procedure for writing a term paper may consist of the following steps:
1. Choosing a subject
2. Finding sources of materials
3. Collecting the notes
4. Outlining the paper
5. Writing the first draft
6. Editing & preparing the final paper

1. Choosing a Subject
The subject chosen should not be too general.

2. Finding Sources of materials
a) The material sources should be not more than 10 years old unless the nature of the paper is such that it involves examining older writings from a historical point of view.
b) Begin by making a list of subject-headings under which you might expect the subject to be listed.
c) The sources could be books and magazine articles, news stories, periodicals, scientific journals etc.

3. Collecting the notes
Skim through sources, locating the useful material, then make good notes of it, including quotes and information for footnotes.
a) Get facts, not just opinions. Compare the facts with author's conclusion.
b) In research studies, notice the methods and procedures, results & conclusions.
c) Check cross references.

4. Outlining the paper
c) Review notes to find main sub-divisions of the subject.
d) Sort the collected material again under each main division to find sub-sections for outline so that it begins to look more coherent and takes on a definite structure. If it does not, try going back and sorting again for main divisions, to see if another general pattern is possible.

5. Writing the first draft
Write the paper around the outline, being sure that you indicate in the first part of the paper what its purpose is. You may follow the following:
a) statement of purpose
b) main body of the paper
c) statement of summary and conclusion
Avoid short, bumpy sentences and long straggling sentences with more than one main idea.

6. Editing & Preparing the final Paper
a) Before writing a term paper, you should ensure you have a question which you attempt to answer in your paper. This question should be kept in mind throughout the paper. Include only information/details/analyses of relevance to the question at hand. Sometimes, the relevance of a particular section may be clear to you but not to your readers. To avoid this, ensure you briefly explain the relevance of every section.
b) Read the paper to ensure that the language is not awkward, and that it "flows" properly.
c) Check for proper spelling, phrasing and sentence construction.
d) Check for proper form on footnotes, quotes, and punctuation.
e) Check to see that quotations serve one of the following purposes:
   i. Show evidence of what an author has said.
   ii. Avoid misrepresentation through restatement.
   iii. Save unnecessary writing when ideas have been well expressed by the original author.
f) Check for proper form on tables and graphs. Be certain that any table or graph is self-explanatory.
Term papers should be composed of the following sections:
1) Title page
2) Table of contents
3) Introduction
4) Review
5) Discussion & Conclusion
6) References
7) Appendix

Generally, the introduction, discussion, conclusion and bibliography part should account for a third of the paper and the review part should be two thirds of the paper.

Discussion
The discussion section either follows the results or may alternatively be integrated in the results section. The section should consist of a discussion of the results of the study focusing on the question posed in the research paper.

Conclusion
The conclusion is often thought of as the easiest part of the paper but should by no means be disregarded. There are a number of key components which should not be omitted. These include:

i) summary of question posed
j) summary of findings
k) summary of main limitations of the study at hand
l) details of possibilities for related future research

Reference
From the very beginning of a research project, you should be careful to note all details of articles gathered. The bibliography should contain ALL references included in the paper. References not included in the text in any form should NOT be included in the bibliography. The key to a good bibliography is consistency. Choose a particular convention and stick to this.

Conventions
Monographs

Edited volumes
Gass, S./Neu, J. (eds.) (1996), Speech acts across cultures. Challenges to communication in a second language. Berlin/ NY: Mouton de Gruyter. [eds.] is used when there is more than one editor; and (ed.) where there is only one editor. In German the abbreviation used is (Hrsg.) for Herausgeber.

Edited articles

Journal articles

Electronic book

Electronic journal articles

Other websites

Unpublished papers
Unpublished theses/ dissertations

Appendix
The appendix should be used for data collected (e.g. questionnaires, transcripts, ...) and for tables and graphs not included in the main text due to their subsidiary nature or to space constraints in the main text.

Assessment Scheme:

Continuous Evaluation
(Based on abstract writing, interim draft, general approach, research orientation, readings undertaken etc.) 40%

Final Evaluation
(Based on the organization of the paper, objectives/ problem profile/ issue outlining, comprehensiveness of the research, flow of the idea/ ideas, relevance of material used/ presented, outcomes vs. objectives, presentation/ viva etc.) 60%
COMMUNICATION SKILLS - III

Course Objective:
To initiate the learners with the basic mechanics of writing skills and facilitate them with the core skills required for communication in the professional world.

Course Contents:

Module I: Mechanics and Semantics of Sentences
Writing effective sentences
Style and Structure

Module II: Developing writing skills
Inter - office communication: Business Letter; E mails; Netiquette
Intra – office communication: Memos, Notices, Circulars, Minutes
Report Writing

Module III: Business Presentations
Planning, design and layout of presentation
Information Packaging
Audience analysis
Audio visual aids
Speaking with confidence
Case Studies

Examination Scheme:

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</table>

CAF – Communication Assessment File
GD – Group Discussion
GP – Group Presentation

Text & References:

- Krishnaswamy, N, Creative English for Communication, Macmillan
BEHAVIOURAL SCIENCE - III  
(LEADING THROUGH TEAMS)

Course Code:  MSI 343      Credit Units: 01

Course Objective:
This course aims to enable students to:
Understand the concept and building of teams
Manage conflict and stress within team
Facilitate better team management and organizational effectiveness through universal human values.

Course Contents:

Module I: Teams: An Overview
Team Design Features: team vs. group
Effective Team Mission and Vision
Life Cycle of a Project Team
Rationale of a Team, Goal Analysis and Team Roles

Module II: Team & Sociometry
Patterns of Interaction in a Team
Sociometry: Method of studying attractions and repulsions in groups
Construction of sociogram for studying interpersonal relations in a Team

Module III: Team Building
Types and Development of Team Building
Stages of team growth
Team performance curve
Profiling your Team: Internal & External Dynamics
Team Strategies for organizational vision
Team communication

Module IV: Team Leadership & Conflict Management
Leadership styles in organizations
Self Authorized team leadership
Causes of team conflict
Conflict management strategies
Stress and Coping in teams

Module V: Global Teams and Universal Values
Management by values
Pragmatic spirituality in life and organization
Building global teams through universal human values
Learning based on project work on Scriptures like Ramayana, Mahabharata, Gita etc.

Module VI: End-of-Semester Appraisal
Viva based on personal journal
Assessment of Behavioural change as a result of training
Exit Level Rating by Self and Observer

Text & References:

- Organizational Behaviour, Davis, K.
- LaFasto and Larson: When Teams Work Best, 2001, Response Books (Sage), New Delhi
Course Objective:
To provide the students with the know-how
• To master the current social communication skills in oral and in written.
• To enrich the formulations, the linguistic tools and vary the sentence construction without repetition.

Course Contents:
Module B: pp. 76 – 88 Unité 6
Module C: pp. 89 to103 Unité 7

Contenu lexical:
Unité 6: se faire plaisir
1. acheter : exprimer ses choix, décrire un objet (forme, dimension, poids et matières) payer
2. parler de la nourriture, deux façons d’exprimer la quantité, commander un repas au restaurant
3. parler des différentes occasions de faire la fête

Unité 7: Cultiver ses relations
1. maîtriser les actes de la communication sociale courante (Salutations, présentations, invitations, remerciements)
2. annoncer un événement, exprimer un souhait, remercier, s’excuser par écrit.
3. caractériser une personne (aspect physique et caractère)

Contenu grammatical:
1. accord des adjectifs qualificatifs
2. articles partitifs
3. Négations avec de, ne…rien/persone/plus
4. Questions avec combien, quel…
5. expressions de la quantité
6. ne…plus/toujours - encore
7. pronoms compléments directs et indirects
8. accord du participe passé (auxiliaire « avoir ») avec l’objet direct
9. Impératif avec un pronom complément direct ou indirect
10. construction avec « que » - Je crois que/ Je pense que/ Je

Examination Scheme:

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C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:
• le livre à suivre : Campus: Tome 1
Course Code: MSI 345      Credit Units: 02

Course Objective:
To enable the students to converse, read and write in the language with the help of the basic rules of grammar, which will later help them to strengthen their language.
To give the students an insight into the culture, geography, political situation and economic opportunities available in Germany

Course Contents:

Module I: Modal verbs
Modal verbs with conjugations and usage
Imparting the finer nuances of the language

Module II: Information about Germany (ongoing)
Information about Germany in the form of presentations or “Referat”- neighbors, states and capitals, important cities and towns and characteristic features of the same, and also a few other topics related to Germany.

Module III: Dative case
Dative case, comparison with accusative case
Dative case with the relevant articles
Introduction to 3 different kinds of sentences – nominative, accusative and dative

Module IV: Dative personal pronouns
Nominative, accusative and dative pronouns in comparison

Module V: Dative prepositions
Dative preposition with their usage both theoretical and figurative use

Module VI: Dialogues
In the Restaurant,
At the Tourist Information Office,
A telephone conversation

Module VII: Directions
Names of the directions
Asking and telling the directions with the help of a roadmap

Module VIII: Conjunctions
To assimilate the knowledge of the conjunctions learnt indirectly so far

Examination Scheme:

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C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- Wolfgang Hieber, Lernziel Deutsch
- Hans-Heinrich Wangler, Sprachkurs Deutsch
- Schulz Griesbach, Deutsche Sprachlehre für Ausländer
- P.L Aneja, Deutsch Interessant- 1, 2 & 3
- Rosa-Maria Dallapiazza et al, Tangram Aktuell A1/1,2
- Braun, Nieder, Schmöe, Deutsch als Fremdsprache 1A, Grundkurs
Course Objective:
To enable students acquire knowledge of the Set/definite expressions (idiomatic expressions) in Spanish language and to handle some Spanish situations with ease.

Course Contents:

Module I
Revision of earlier semester modules
Set expressions (idiomatic expressions) with the verb Tener, Poner, Ir…
Weather

Module II
Introduction to Gustar…and all its forms. Revision of Gustar and usage of it

Module III
Translation of Spanish-English; English-Spanish. Practice sentences.
How to ask for directions (using estar)
Introduction to IR + A + INFINITIVE FORM OF A VERB

Module IV
Simple conversation with help of texts and vocabulary
En el restaurante
En el instituto
En el aeropuerto

Module V
Reflexives

Examination Scheme:

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C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- Español, En Directo I A
- Español Sin Fronteras -Nivel Elemental
Course Code: MSI 347       Credit Units: 02

Course Objective:
To enable the students to converse in the language with the help of basic verbs and to express themselves effectively and narrate their everyday short encounters. Students are also given projects on Japan and Japanese culture to widen their horizon further.
Note: The Japanese script is introduced in this semester.

Course Contents:

Module I: Verbs
Different forms of verbs: present continuos verbs etc

Module II
More Adverbs and adverbial expressions

Module III: Counters
Learning to count different shaped objects,

Module IV: Tenses
Past tense, Past continuous tense.

Module V: Comparison
Comparative and Superlative degree

Module VI: Wishes and desires
Expressing desire to buy, hold, possess. Usage in negative sentences as well.
Comparative degree, Superlative degree.

Module VII: Appointment
Over phone, formal and informal etc.

Learning Outcome
➢ Students can speak the language and can describe themselves and situations effectively
➢ They also gain great knowledge in terms of Japanese lifestyle and culture, which help them at the time of placements.

Methods of Private study /Self help
➢ Handouts, audio-aids, and self-do assignments.
➢ Use of library, visiting and watching movies in Japan and culture center every Friday at 6pm.

Examination Scheme:

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C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

Text:
➢ Teach yourself Japanese

References:
➢ Shin Nihongo no kiso 1
Course Objective:
Foreign words are usually imported by translating the concept into Chinese, the emphasis is on the meaning rather than the sound. But the system runs into a problem because the underlying name of personal name is often obscure so they are almost always transcribed according to their pronunciation alone. The course aims at familiarizing the student with the basic aspects of speaking ability of Mandarin, the language of Mainland China. The course aims at training students in practical skills and nurturing them to interact with a Chinese person.

Course Contents:

Module I
Drills
Dialogue practice
Observe picture and answer the question.
Introduction of written characters.
Practice reading aloud
Practice using the language both by speaking and by taking notes.
Character writing and stroke order

Module II
Measure words
Position words e.g. inside, outside, middle, in front, behind, top, bottom, side, left, right, straight.
Directional words – beibian, xibian, nanbian, dongbian, zhongjian.
Our school and its different building locations.
What game do you like?
Difference between “hii” and “neng”, “keyi”.

Module III
Changing affirmative sentences to negative ones and vice versa
Human body parts.
Not feeling well words e.g. ; fever, cold, stomach ache, head ache.
Use of the modal particle “le”
Making a telephone call
Use of “jiu” and “cal” (Grammar portion)
Automobiles e.g. Bus, train, boat, car, bike etc.
Traveling, by train, by airplane, by bus, on the bike, by boat.. etc.

Module IV
The ordinal number “di”
“Mei” the demonstrative pronoun e.g. mei tian, mei nian etc.
use of to enter to exit
Structural particle “de” (Compliment of degree).
Going to the Park.
Description about class schedule during a week in school.
Grammar use of “li” and “cong”.
Comprehension reading followed by questions.

Module V
Persuasion-Please don’t smoke.
Please speak slowly
Praise – This pictorial is very beautiful
Opposites e.g. Clean-Dirty, Little-More, Old-New, Young-Old, Easy-Difficult, Boy-Girl, Black-White, Big-Small, Slow-Fast … etc.
Talking about studies and classmates
Use of “it doesn’t matter”
Enquiring about a student, description about study method.
Grammar: Negation of a sentence with a verbal predicate.
Examination Scheme:

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</table>

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- “Elementary Chinese Reader Part I, Part-2” Lesson 21-30
SUMMER INTERNSHIP

GUIDELINES FOR SUMMER TRAINING

The main objective of Summer training is to familiarize students to laboratory environment and make them learn to handle equipments and softwares, design experiments and analyze the results. The student will be supervised by one or more faculty members and he or she will be required to submit a synopsis. While writing a synopsis emphasis should be given to make it publishable. But whether or not the results of a research project are publishable, the project should be communicated in the form of a research report written by the student. Initial drafts should be critiqued by the faculty guide and corrected by the student at each stage. The File is the principal means by which the work carried out will be assessed and therefore great care should be taken in its preparation.

In general, the File should be comprehensive and include

- A short account of the activities that were undertaken as part of the project;
- A statement about the extent to which the project has achieved its stated goals.
- A statement about the outcomes of the evaluation and dissemination processes engaged in as part of the project;
- Any activities planned but not yet completed as part of the project, or as a future initiative directly resulting from the project;
- Any problems that have arisen that may be useful to document for future reference.

Report Layout

The report should contain the following components:

- TITLE PAGE
- CERTIFICATE
- ACKNOWLEDGEMENT
- ABBREVIATIONS
- CONTENTS WITH PAGE NUMBERS
- CHAPTER –
  a. INTRODUCTION
  b. REVIEW OF LITERATURE
  c. MATERIALS & METHODS
  d. RESULTS & DISCUSSION
  e. SUMMARY AND CONCLUSION
  f. REFERENCES
  g. APPENDIX (OPTIONAL)

- 1 inch Margin on left side & 1”each on other sides.
- Single side of the paper to be used.
- Times New Roman.

Font Size

- 12 (Bold for headings)
- 12 (Normal for Matter)
- 14 (for Chapter Names)
- 1.5 line spacing
- Numbering on the right hand Top of the page
- Numbers on pages before chapters to be done in Roman at the bottom of the page

References

This should include papers and books referred to in the body of the report. These should be ordered alphabetically on the author’s surname. The titles of journals preferably should not be abbreviated; if they are, abbreviations must comply with an internationally recognised system.

Examples

For research article
For Book

- Scientific names in Italics
- Cover Page containing - Title, Students Name, Supervisors Name, University, Name (along with logo), Course name & year of Submission in the prescribed format
- 2 copies to be submitted

ASSESSMENT OF THE PROJECT FILE

Essentially, marking will be based on the following criteria: the quality of the report, the technical merit of the project and the project execution. Evaluation will compose of two components - Project report assessment and Viva-voce. Project report assessment will be done by the two internal faculty members in respective fields. A committee of three faculty members will conduct Viva-voce. Technical merit attempts to assess the quality and depth of the intellectual efforts put into the project will be assessed as per evaluation format.

Examination Scheme:

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<td>Viva Voce</td>
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<td><strong>Total</strong></td>
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IPR AND BIOSAFETY IN BIOTECHNOLOGY

Course Objective:
To provide and expand bilateral technical cooperation in relation to areas such as patent search and examination, computerization and human resources development in order to ensure adequate intellectual property right protection.

Course Contents:

Module I

Module II
Basic Requirements of Patentability: Patentable Subject Matter, Novelty and the Public Domain, Nonobviousness.

Module III
Special Issue in Biotechnology Patents: Disclosure Requirements, Collaborative Research, Competitive Research, Plant Biotechnology, Foreign Patents.

Module IV

Module V
Public acceptance issues for biotechnology: Case studies/experiences from developing and developed countries. Biotechnology and hunger: Challenges for the Indian Biotechnological research and industries. The Cartagena protocol on biosafety. Biosafety Management: Key to the environmentally responsible use of biotechnology. Ethical implications of biotechnological products and techniques. Social and ethical implications of biological weapons.

Examination Scheme:

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Text & References:

Text:

References:
Course Objective:
To develop understanding of information and library science research issues in the domain of bioinformatics through review of journal articles, invited talks, and critical group discussions of methods. The main objectives for this course are to develop: familiarity with information and library science-oriented problems in the biomedical sciences, an understanding of research methods in the biomedical domain, critical thinking and evaluation skills and presentation and summarization skills.

Course Contents:

Module I
Introduction: Science, Scientific Field and Biological research. Role of a researcher in different stages of a project, Routes to research funding (academic and commercial)

Module II

Module III

Module IV
Type of Articles (review, letters etc). Scientific paper format (Abstract, Introduction, Materials and Methods, Results, Discussion). Writing, evaluating, presenting and publishing the results of scientific research in the academic press (journals, conferences etc). Choosing the appropriate journal (Sources, Information, Instructions to authors, peer review system, journal evaluation)

Module V
Case studies of areas of current research. Formulating a research plan and its presentation

Examination Scheme:

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</table>

Text & References:

Text:
- Statistical Methods By S.P. Gupta

References:
- Research Methodology Methods and Techniques By C.R. Kothari
- Statistics(Theory and Practice) By B.N. Gupta
- Research Methodology Methods and statistical Techniques By Santosh Gupta
- Scientific journals and magazines
BIOJAVA

Course Code: MSI 403  Credit Units: 04

Course Objective:
The objective is to familiarize students with the applications of Java and their relevance in biology.

Course Contents:

Module I
Introduction to BioJava, Installation and getting started

Module II: Basic Sequence Manipulation
Working with sequences Sub Sequence, Transcribe, Reverse, Change Name, Sequence Edit, Regex, Translation, Translation: Single, Translation: Six Frames, Proteomics, AAindex

Sequence I/O
Reading and writing files, Creative file parsing with Rich SeqIOListener
WriteInFasta, ReadFasta, ReadGES, GbtoFasta, ABItoSequence, SeqIO:Echo

Annotation
Annotations and Comments, Annotations: List, Filter

Location & Feature
Locations: Point, Range, Circular, Feature, Filter, Locations: Remove

Module III
BLAST & FASTA
Blast: Parser, Fasta: Parser, Blast: Extract, Blast: Echo

Module IV: Counts & Distribution
Count: Residues, Count: Frequency, To Distrib, Random Seqs, Entropy, Emissionf, Custom
BioJava: CookBook: Distribution: XML, Distribution: Gibbs, Distribution: Bayes, Distribution: Composition
Weight Matrices and Dynamic Programming

USER INTERFACE
ViewAsTree, ViewInGUI, Coordinates, Features, Protein Peptide Features

Module V: Biosql and Database
BioSQL and Hibernate, BioSQL Setup PostGre, BioSQL: SetupOracle, BioSQL: Manage

Protein Structure
PDB: read, PDB: mutate

Examination Scheme:

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Text & References:

Text:
- The Complete Reference JAVA 2: 5th. ed. by Schildt Herbert

References:
- Core Java: Advanced Features, Horstmann
- Java Servlet Programming Hunter J, Crauford
- Java Server Programming J2EE edition Allamaraju, et.al.
WEB APPLICATIONS USING .NET

Course Code: MSI 404 Credit Units: 04

Course Objective:
The objective of this course is to make students well versed with concept and implementation of .NET technology into different type of application

Course Contents:

Section A: Developing Web Applications in VS.NET using ASP.NET

Module I
Introduction to ASP.NET Web Forms, Configure IIS settings, ASP.NET Page Structure, List the various Page events, List the various Page properties, ViewState object, Web Controls, Use Controls for Text Entry, Control Transfer, Selection, Discuss Rich Controls

Module II
HTML Controls, Explore the various Validation Controls, Use the Response object, Request object Server Object, Discuss the Global.asax file, Explain the events in Global.asax file, Use the Application Object, Create and read cookies, Use the Session Object.

Module III
Implement Databinding, Use DataList control, DataView to sort and filter, Understand Transactions in ASP.NET, Add a DataGrid control to web form, Bind DataGrid, Customize a DataGrid, Select, Update, Delete records in a DataGrid

Section B: Programming in VS.NET using C#

Module I
Introduction .NET Framework structure and .NET Framework features (CLR, JIT, CTS, MSIL, Garbage Collection), List commonly used .NET Framework namespaces

Module II
Variables and constants, basic data types in C#, concepts of boxing and unboxing, different types of Operators, various selection and iteration constructs, Arrays, structures and enumerators.

Module III
Classes and Objects in C#, Constructors and Destructors in C#, access modifiers in C#, Methods, Namespaces, Inheritance, concepts of interfaces, Employ method overriding in C#, Properties, types of properties such as (Read/Write, Read-only, Write-only, Static), Indexers, Implement Delegates, Define and raise Events debugging and troubleshoot applications, testing of C#, applications, Differentiate between Testing and Debugging, Error Handling.

Examination Scheme:

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Text & References:

Text:
• ASP.NET Unleashed by Stephen Walther

References:
• Wrox Press-Professional ASP.NET 1.1 by Alex Homer et al
• Programming ASP.NET by Jesse Liberty
• Programming Visual C#.NET 2003 by Jesse Liberty
• Professional C# -WROX
Course Code: MSI 420  
Credit Units: 03

Course Contents:

Module I  
Basic sequence manipulation, Six Frame Translation, Transcription, AAIndex

Module II  
Reading and Writing of Files, Parsing of different file format like FASTA, Swissprot, Genbank

Module III  
Annotation and file filtering, Location and feature

Module IV  
BLAST and FASTA programming. Dynamic Programming.

Module V  
Biological Database modules, BioSQL, Protein Structure: Read/mutate

Examination Scheme:

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<th>IA</th>
<th>EE</th>
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<td>Major Experiment</td>
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<td>Mid Term Viva</td>
<td>Minor Experiment/Spotting</td>
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<td>Attendance</td>
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The examination of Basics of Computer System and Programming Practical will be held out of 100 marks during end term examination.
WEB APPLICATIONS USING .NET LAB

Course Code: MSI 421      Credit Units: 03

Course Contents:

Module I
Implementation of control statements, Array, structures and enumerators, Boxing, Unboxing,

Module II
Classes and Objects, Constructors and Destructors, Namespaces, Inheritance, interfaces, Polymorphism method overriding.

Module III
Properties, Indexers, Delegates, Events, Multithreading, collection, error handling.

Examination Scheme:

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The examination of Basics of Computer System and Programming Practical will be held out of 100 marks during end term examination.
COMMUNICATION SKILLS - IV

Course Code: MSI 441        Credit Units: 01

Course Objective:
To facilitate the learner with Academic Language Proficiency and make them effective users of functional language to excel in their profession.

Course Contents:

Module I: Introduction to Speaking Skills
Business Conversation
Effective Public Speaking
Art of Persuasion

Module II: Speaking for Employment
Types of Interview
Styles of Interview
Facing Interviews-Fundamentals and Practice Session
Conducting Interviews- Fundamentals and Practice Session
Question Answer on Various Dimensions

Module III: Basic Telephony Skills
Guidelines for Making a Call
Guidelines for Answering a Call
Telephone Word Groups
Answering Systems and Voice-Mail

Module IV: Work Place Speaking
Team Briefing
Conflict Management
Negotiations
Participation in Meetings
Keynote Speeches

Examination Scheme:

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</table>

CAF – Communication Assessment File
GD – Group Discussion
GP – Group Presentation

Text & References:

- Jermy Comfort, Speaking Effectively, et.al, Cambridge
- Krishnaswamy, N, Creative English for Communication, Macmillan
- Taylor, Conversation in Practice.
Course Objective:
This course aims at imparting an understanding of:
Build and leverage your professional reputation
Maintain focus in pressure situations
Make a balanced choice between professional and personal commitments

Course Contents:

Module I: Individual, Society and Nation
Individual Differences and Dimensions of Personality
Socialization Process
Relating to the Nation: Values, Culture, Religion
Sense of pride and Patriotism
Managing Diversity

Module II: Components of Excellence
Personal Excellence:
Identifying long-term choices and goals
Uncovering the talent, strength & style
Analyzing choke points in your personal processes by analysis in area of placements, events, seminars, conferences, extracurricular activities, projects etc.
Developing professional power: Goal-setting, time management, handling criticism, interruptions and time wasters

Module III: Career Planning
Knowing one’s Interest and Aptitude
Identifying available Resources
Setting goals to maintain focus:
Developing Positive attributes in personality
Self-reliance and Employability skills

Module IV: Stress Management for Healthy Living
Meaning and Nature of Stress
Stages of stress
Causes and Consequences of stress: Personal, Organizational and Environmental
Personal Styles and strategies of coping

Module V: Professional Success
Building independence & interdependence
Reducing resistance to change
Continued reflection (Placements, events, seminars, conferences, projects extracurricular Activities etc.)

Module VI: End-of-Semester Appraisal
Viva based on personal journal
Assessment of Behavioural change as a result of training
Exit Level Rating by Self and Observer

Text & References:
FRENCH - IV

Course Code: MSI 444
Credit Units: 02

Course Objective:
To enable students:
• To develop strategies of comprehension of texts of different origin
• To present facts, projects, plans with precision

Course Contents:
Module C: pp. 104 – 139: Unités 8, 9

Contenu lexical: Unité 8: Découvrir le passé
1. parler du passé, des habitudes et des changements.
2. parler de la famille, raconter une suite d’événements/préciser leur date et leur durée.
3. connaître quelques moments de l’histoire

Unité 9: Entreprendre
1. faire un projet de la réalisation: (exprimer un besoin, préciser les étapes d’une réalisation)
2. parler d’une entreprise
3. parler du futur

Contenu grammatical: 1. Imparfait
2. Pronom « en »
3. Futur
4. Discours rapporté au présent
5. Passé récent
6. Présent progressif

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C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:
• le livre à suivre : Campus: Tome 1
GERMAN - IV

Course Code: MSI 445  Credit Units: 02

Course Objective:
To enable the students to converse, read and write in the language with the help of the basic rules of grammar, which will later help them to strengthen their language.
To give the students an insight into the culture, geography, political situation and economic opportunities available in Germany.
Introduction to Advanced Grammar Language and Professional Jargon

Course Contents:

Module I: Present perfect tense
Present perfect tense, usage and applicability
Usage of this tense to indicate near past
Universal applicability of this tense in German

Module II: Letter writing
To acquaint the students with the form of writing informal letters.

Module III: Interchanging prepositions
Usage of prepositions with both accusative and dative cases
Usage of verbs fixed with prepositions
Emphasizing on the action and position factor

Module IV: Past tense
Introduction to simple past tense
Learning the verb forms in past tense
Making a list of all verbs in the past tense and the participle forms

Module V: Reading a Fairy Tale
Comprehension and narration
Rotkäppchen
Froschprinzessin
Die Fremdsprache

Module VI: Genitive case
Genitive case – Explain the concept of possession in genitive
Mentioning the structure of weak nouns

Module VII: Genitive prepositions
Discuss the genitive propositions and their usage: (während, wegen, statt, trotz)

Module VIII: Picture Description
Firstly recognize the persons or things in the picture and identify the situation depicted in the picture;
Secondly answer questions of general meaning in context to the picture and also talk about the personal experiences which come to your mind upon seeing the picture.

Examination Scheme:

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C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- Wolfgang Hieber, Lernziel Deutsch
- Hans-Heinrich Wangler, Sprachkurs Deutsch
- Schulz Griesbach, Deutsche Sprachlehre für Ausländer
- P.L Aneja, Deutsch Interessant- 1, 2 & 3
- Rosa-Maria Dallapiazza et al, Tangram Aktuell A1/1,2
- Braun, Nieder, Schmöe, Deutsch als Fremdsprache 1A, Grundkurs
Course Objective:
To enable students acquire working knowledge of the language; to give them vocabulary, grammar, voice modulations/intonations to handle everyday Spanish situations with ease.

Course Contents:

Module I
Revision of earlier semester modules
Introduction to Present Continuous Tense (Gerunds)

Module II
Translation with Present Continuous Tense
Introduction to Gustar, Parecer, Apetecer, doler

Module III
Imperatives (positive and negative commands of regular verbs)

Module IV
Commercial/business vocabulary

Module V
Simple conversation with help of texts and vocabulary
En la recepcion del hotel
En el restaurante
En la agencia de viajes
En la tienda/supermercado

Examination Scheme:

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C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- Español Sin Fronteras (Nivel – Elemental)
Course Objective:
To enable the students to comfortably interact using basic Japanese.
Note: Teaching is done in roman as well as Japanese script, students will be taught katankana (another form of script) in this semester i.e. to be able to write all the foreign words in Japanese.

Course Contents:

Module I
Comparison using adjectives, Making requests

Module II
Seeking permission

Module III
Practice of conversations on:
Visiting people, Party, Meetings, After work, At a ticket vending machine etc

Module IV
Essays, writing formal letters

Learning Outcome
➢ Students can speak the language describing above-mentioned topics.

Methods of Private study /Self help
➢ Handouts, audio-aids, and self-do assignments, role-plays.
➢ Students are also encouraged to attend Japanese film festival and other such fairs and workshops organized in the capital from time to time.

Examination Scheme:

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C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

Text:
➢ Teach yourself Japanese

References:
➢ Shin Nihongo no kiso 1
CHINESE – IV

Course Code: MSI 448      Credit Units: 02

Course Objective:
How many characters are there? The early Qing dynasty dictionary included nearly 50,000 characters the vast majority of which were rare accumulated characters over the centuries. An educate person in China can probably recognize around 6000 characters. The course aims at familiarizing the student with the basic aspects of speaking ability of Mandarin, the language of Mainland China. The course aims at training students in practical skills and nurturing them to interact with a Chinese person.

Course Contents:

Module I
Dialogue Practice
Observe picture and answer the question
Pronunciation and intonation
Character writing and stroke order.
Electronic items

Module II
Traveling – The Scenery is very beautiful
Weather and climate
Grammar question with – “bu shi …. Ma?”
The construction “yao … le” (Used to indicate that an action is going to take place)
Time words “yiqian”, “yiwai” (Before and after).
The adverb “geng”.

Module III
Going to a friend house for a visit meeting his family and talking about their customs.
Fallen sick and going to the Doctor, the doctor examines, takes temperature and writes prescription.
Aspect particle “guo” shows that an action has happened some time in the past.
Progressive aspect of an actin “zhengzai” Also the use if “zhe” with it.
To welcome someone and to see off someone …. I cant go the airport to see you off… etc.

Module IV
Shipment. Is this the place to checking luggage?
Basic dialogue on – Where do u work?
Basic dialogue on – This is my address
Basic dialogue on – I understand Chinese
Basic dialogue on – What job do u do?
Basic dialogue on – What time is it now?

Module V
Basic dialogue on – What day (date) is it today?
Basic dialogue on – What is the weather like here.
Basic dialogue on – Do u like Chinese food?
Basic dialogue on – I am planning to go to China.

Examination Scheme:

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C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

•  “Elementary Chinese Reader, Part-2” Lesson 31-38
GUIDELINES FOR PROJECT FILE

Research experience is as close to a professional problem-solving activity as anything in the curriculum. It provides exposure to research methodology and an opportunity to work closely with a faculty guide. It usually requires the use of advanced concepts, a variety of experimental techniques, and state-of-the-art instrumentation. Research is genuine exploration of the unknown that leads to new knowledge which often warrants publication. But whether or not the results of a research project are publishable, the project should be communicated in the form of a research report written by the student. Sufficient time should be allowed for satisfactory completion of reports, taking into account that initial drafts should be critiqued by the faculty guide and corrected by the student at each stage. The File is the principal means by which the work carried out will be assessed and therefore great care should be taken in its preparation.

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- A statement about the extent to which the project has achieved its stated goals.
- A statement about the outcomes of the evaluation and dissemination processes engaged in as part of the project;
- Any activities planned but not yet completed as part of the project, or as a future initiative directly resulting from the project;
- Any problems that have arisen that may be useful to document for future reference.

Report Layout

The report should contain the following components:

- **Title or Cover Page**
  The title page should contain the following information: Project Title; Student’s Name; Course; Year; Supervisor’s Name.

- **Acknowledgements** (optional)
  Acknowledgment to any advisory or financial assistance received in the course of work may be given.

- **Abstract**
  A good "Abstract" should be straight to the point; not too descriptive but fully informative. First paragraph should state what was accomplished with regard to the objectives. The abstract does not have to be an entire summary of the project, but rather a concise summary of the scope and results of the project.

- **Table of Contents**
  Titles and subtitles are to correspond exactly with those in the text.

- **Introduction**
  Here a brief introduction to the problem that is central to the project and an outline of the structure of the rest of the report should be provided. The introduction should aim to catch the imagination of the reader, so excessive details should be avoided.

- **Materials and Methods**
  This section should aim at experimental designs, materials used. Methodology should be mentioned in details including modifications if any.

- **Results and Discussion**
  Present results, discuss and compare these with those from other workers, etc. In writing these section, emphasis should be given on what has been performed and achieved in the course of the work, rather than discuss in detail what is readily available in text books. Avoid abrupt changes in contents from section to section and maintain a lucid flow throughout the thesis. An opening and closing paragraph in every chapter could be included to aid in smooth flow.

Note that in writing the various sections, all figures and tables should as far as possible be next to the associated text, in the same orientation as the main text, numbered, and given appropriate titles or captions. All major equations should also be numbered and unless it is really necessary never write in “point” form.
Conclusion
A conclusion should be the final section in which the outcome of the work is mentioned briefly.

Future prospects

Appendices
The Appendix contains material which is of interest to the reader but not an integral part of the thesis and any problem that have arisen that may be useful to document for future reference.

References / Bibliography
This should include papers and books referred to in the body of the report. These should be ordered alphabetically on the author's surname. The titles of journals preferably should not be abbreviated; if they are, abbreviations must comply with an internationally recognised system.

Examples
For research article

For book

ASSESSMENT OF THE PROJECT FILE

Essentially, marking will be based on the following criteria: the quality of the report, the technical merit of the project and the project execution.
Technical merit attempts to assess the quality and depth of the intellectual efforts put into the project.
Project execution is concerned with assessing how much work has been put in.
The File should fulfill the following assessment objectives:

Range of Research Methods used to obtain information

Execution of Research

Data Analysis
Analyse Quantitative/ Qualitative information
Control Quality

Draw Conclusions

Examination Scheme:

<table>
<thead>
<tr>
<th>Component</th>
<th>Mark</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project Report</td>
<td>50</td>
</tr>
<tr>
<td>Viva Voce</td>
<td>50</td>
</tr>
<tr>
<td><strong>Total</strong></td>
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