Bachelor of Science (Honours) Biotechnology

Programme Code: BSB

Duration – 3 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

B. Sc. (H) Biotechnology aims to develop highly specialized hard core specialization in various diversified areas of biotechnology and its application to medicine, agriculture, environment, nutraceuticals and functional food etc.

The curriculum has an inbuilt system of industrial summer training which keeps students abreast of latest industrial applications. Last semester is mainly devoted to research orientated project which helps the student to develop independent scientific temper with ability to execute a time bound fact finding initiative.

The curriculum imparts training in both fundamental and applied aspects of biotechnology. Each subject is adequately supported by applied practical conducted in well equipped laboratories in the area of Biotechnology, Animal Biotechnology & Immunology. The programme has a well conceived curriculum so as to fulfill the requirement for higher academic pursuits in Biotechnology.
## PROGRAMME STRUCTURE

### FIRST SEMESTER

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Note: The students will study English from I semester but final evaluation will be done at the end of IIInd semester. However continuous evaluation will start from the 1st Semester

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### TERM PAPER: 4 – 6 WEEKS

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**FOURTH SEMESTER**

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**SUMMER TRAINING: 4 – 6 WEEKS**

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Note: Eco-Social Evolution & Biotechnology (BSB 604 - 2 Credit Units) will be studied by the old batches i.e. 2007-10 & 2008-11Batch
INTRODUCTORY BIOCHEMISTRY AND BIOPHYSICS

Course Code: BSB 101  Credit Units: 03

Course Objective:
Basics in Biochemistry and Biophysics will be taught to the students in the first year itself, which will act as a foundation for all further courses in Biotechnology. The students will be familiarized with structures and functions of biomolecules and basic energetic that governs the biological reactions.

Course Contents:

Module I: Nature of Biological materials

Module II: Perspectives of biological macromolecules
Types of chemical bonds, hydrophilic and hydrophobic groups in biomolecules, repeating units in proteins and nucleic acids, Basis for intermolecular interaction with examples.

Module III: Bio-energetic
Laws of thermodynamics (1st & 2nd laws), electrical properties of biological compartments; electrochemical gradients, membrane potential, chemiosmotic hypothesis.

Module IV: Energetic of a living body
Primary events in photosynthesis; strategies of light reception in microbes, plants and animals. Correction of vision faults, generation and reception of sonic vibrations.

Module V: Electrical properties of biological compartments
Electricity as a potential signal, Neurotransmitters, Intra and intermolecular interactions in biological system Spatial and charge compatibility as determinant of such interactions.

Examination Scheme:

<table>
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<th>Components</th>
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<th>Attendance</th>
<th>Assignment/Project/Seminar/Quiz</th>
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</table>

Text & References:

Text:
- Outline of Biochemistry, Conn & Stumph
- Fundamentals of Biochemistry, J.L. Jain

References:
- Textbook of Biochemistry, Lehninger
- Biochemistry, L. Stryer, W.H. Freeman and Company
- Instant notes in Biochemistry, Hames & Hooper
- Anatomy and Physiology – Tortora & Grabowski
- Biochemistry - Voet & Voit
BIOANALYTICAL TECHNIQUES

Course Code: BSB 102 Credit Units: 03

Course Objective:
The student will be exposed to principles, instrumentation & application of various instruments & techniques used in biological field.

Course Contents:

Module I: Instruments, basic principles and usage
pH meter, absorption and emission spectroscopy, Principle and law of absorption, fluorimetry, colorimetry, spectrophotometry (visible, UV, infra-red), polarography, centrifugation, atomic absorption, NMR, X-ray crystallography.

Module II: Chromatography techniques
Paper chromatography, thin layer chromatography, column chromatography, HPLC, gas chromatography, gel filtration and ion exchange chromatography,

Module III: Electrophoresis
SDS polyacrylamide electrophoresis, immunoelectrophoresis, Isoelectric focussing.

Module IV: Radioisotope tracer techniques and autoradiography

Examination Scheme:

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</table>

Text & References:

Text:
- Practical Biochemistry, Principles and Techniques, Keith Wilson and John Walker
- Bioinstrumentation, Webster

References:
- Advanced Instrumentation, Data Interpretation, and Control of Biotechnological Processes, J.F. Van Impe, Kluwer Academic
- Crystal Structure Analysis, J.P. Glusker and K.N. Trueblood, Oxford University Press
- Modern Spectroscopy, J.M. Hollas, John Wiley and Son Ltd.
- NMR Spectroscopy: Basic Principles, Concepts and Applications in Chemistry, H. Gunther, John Wiley and Sons Ltd.
- Principles of Physical Biochemistry, K.E. Van Holde, Prentice Hall.
- Principles and Practice of Bioanalysis, Richard F. Venn
- Microscopic Techniques in Biotechnology, Michael Hoppert
- Principles of Fermentation Technology, P.F. Stanbury, A. Whitaker, S.J. Hall
CELL BIOLOGY

Course Code: BSB 103  
Credit Units: 03

Course Objective:
The objective of this course is to provide a conceptual frame work for dealing with the evolving understanding of cell. The students will learn about cell as a unit of living systems, its various organelles, their structure, function and metabolic processes.

Course Contents:

Module I: Cell as a basic unit of living systems
The cell theory, precellular evolution; broad classification of cell types: archaebacteria, PPLOs, bacteria, eukaryotic microbes, plant – and animal cells; cell, tissue, organ and organisms, different levels of organization.

Module II: Ultrastructure of the cell membrane and cell organelles
Ultrastructure of cell membrane and function, Structure of cell organelles; golgi bodies, endoplasmic reticulum (rough and smooth), ribosomes; cytoskeletal structures (actin, microtubules.), mitochondria, chloroplast, lysosomes, peroxysomes, nucleus (nuclear membrane, nucleoplasm, nucleolus).

Module III: Chromosomes
Structural organisation of chromosomes, chromatids, centromere, telomere, chromatin, nucleosome organisations; eu-and heterochromatin.

Module IV: Cell division and cell cycle
Cell cycle, interphase, mitosis and meiosis

Module V: Cell – Cell interaction
Cell locomotion (amoeboid, flagellar and ciliar); cell senescence and death (apoptosis).

Module VI: Cell differentiation
Mechanism of cell differention (e.g., RBC);difference between normal and cancer cells.

Examination Scheme:

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</table>

Text & References:

Text:
- Cell and Molecular Biology, DeRobertis, B.I. Publication Pvt. Ltd.
- Cell and Molecular Biology - Sheelar & Bianchi, John Wiley

References:
- Cell and Molecular Biology, Gerald Karp, John Wiley and Sons Inc.
- Cell Biology, Singh & Tomar
- The world of the cell – Becker, Klinshmith & Harden, Pearson
MATHS AND BIOSTATISTICS

Course Code: BSB 104  Credit Units: 03

Course Objective:
The course involves a working understanding of tools of mathematical & statistical skills in the field of biology.

Course Contents:

MATHS

Module I: Bridge course
Set theory and properties of subsets, Binomial theorem of integer, logarithm (definition & laws of logarithm, use of log table), surds, square root & cube root,

Module II
Function, limits of functions, (basic idea of limits of functions without analytic definition), derivatives of functions, Matrices (Fundamental calculations and calculation of Eigen values) and Series

BIOSTATISTICS

Module III
Measure of central tendency and measure of dispersion
Probability (classical & axiomatic definition of probability, theorem on total and compound probability), Addition and Multiplication theorem of Probability, Random variables and Probability Distribution
Simple problems involving Binomial, Poisson and Normal variables,

Module IV
Correlation and regression,
Methods of sampling, collection of data: primary & secondary data, Probability Sampling and non Probability Sampling methods

Examination Scheme:

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</table>

Text & References:

Text:
- Fundamental of Biostatistics, Bernard Rosner, Oxford University Press
- Mathematical Statistics, H.C. Saxena, S. Chand & Company

References:
- Introduction to Probability Theory, P.G. Hoel, Houghton Mifflin College
- Schaum’s Outline of Probability, Random Variables and Random Processes, H.P. Hsu, McGraw-Hill Trade
- Statistics of Extremes, E.J. Gumbel, Columbia University Press
Course Objective:
The objective of this course is to familiarize the students with the classification, morphology, reproduction and economic importance of various groups of lower plants which will provide the basic knowledge for the employment of these plants to study plant biotechnology.

Course Contents:

Module I: Algae
Fritsch Classification, occurrence, structure, systematic position mode of reproduction and economic importance of the following genera: *Chlamydomonas, Chara, Sargassum, Polysiphonia, Nostoc.*

Module II: Fungi
Outlines of classification of fungi, position, occurrence, structure and mode of reproduction in fungi, based on the following representatives: *Eurotium, Morchella, Agaricus* and *Alternaria,* Economic importance of fungi, Lichens: Classification, occurrence, systematic position, mode of nutrition, reproduction and economic importance.

Module III: Bryophytes
Outlines of classification and importance of bryophytes, Systematic position occurrence, morphology, anatomy and reproduction in, *Marchantia, Anthoceros* (Development of Sporophyte only).

Module IV: Pteridophytes
Systematic Position, occurrence, morphology, anatomy and development of reproductive structures of *Selaginella, Equisetum* and *Marsilea,* Stelar system and its evolution in Pteridophytes, Heterospory and seed habit.

Examination Scheme:

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</table>

Text & References:

Text:
- College Botany Vol. I and II, Ganguli and Kar

References:
- Introductory Phycology, H. D. Kumar.
- Introductory Mycology, Alexopaulos and Mims
- Cryptogamic Botany, G. M. Smith.
- A Text book of Algae, B. R. Vashishtha
- Bryophytes, N. S. Parihar
- Pteridophytes, N. S. Parihar
- An Introduction to Pteridophytes, A. Rashid.
CHEMISTRY - I

Course Code: BSB 106  Credit Units: 03

Course Objective:
The objective of this course is to educate the students about molecules, their energy to form bonds, metallurgy of elements, kinetic theory of gases, Vander walls equation and also enzymatic catalysis.

Course Contents:

INORGANIC

Module I
Chemical bonds and molecules, Shapes of simple molecules, bond energy, bond length, resonance and Hydrogen bond.

Module II
Radioactivity: Natural and artificial, group displacement law, half life period, binding energy, nuclear reaction equations, isotopes, tracers, radio dating, Application of radioactivity.

Module III
Periodic table: Modern periodic table, periodicity in properties of elements, atomic radii, ionic and covalent radii, ionization energies, electron affinity, electro-negativity.

Module IV
Metallurgy of S block elements (Na, K, Be, Mg, Ca)

PHYSICAL

Module V
Gases: Kinetic theory of gases, Vander Waal’s equation, critical constants, Liquefaction of gases.

Module VI

Examination Scheme:

<table>
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Text & References:

Text:

References:
- Simplified Course in Inorganic Chemistry, Madan & Tuli, S. Chand & Co. Ltd.
- Concise Inorganic Chemistry, J.D. Lee, Black Well Sciences
- Essentials of Physical Chemistry, Bahl & Tuli, S. Chand & Co. Ltd.
- Simplified course in Physical Chemistry, Madan & Tuli, S. Chand & Co. Ltd.
- Atkin’s Physical Chemistry, Atkin, Oxford Press.
- Physical Chemistry, Vemulapalli, Printice Hall of India
BIOTECHNOLOGY LAB – I
(BASED ON BIOCHEMISTRY, CELL BIOLOGY AND BIOSTATISTICS)

Course Code: BSB 120
Credit Units: 03

Course Contents:

Module I: Biochemistry

Module II: Cell Biology
Cytological preparations, Fixation, dehydration and staining. Squash preparation of meiotic and mitotic cells, Embedding and sectioning.

Module III: Biostatistics
Problems on test of significance, t-test, chi-square test for goodness of fit and analysis of variance (ANOVA)

Examination Scheme:

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CHEMISTRY LAB - I

Course Code: BSB 121
Credit Units: 01

Course Contents:

INORGANIC CHEMISTRY

Module I
Volumetric analysis: Oxidation-reduction titration using KMnO₄ and K₂Cr₂O₇

Module II
Iodometry titrations: Estimation of sodium thiosulphate & potassium dichromate.

Module III
Preparation of the following inorganic compounds: Prussion blue from iron fillings, chrome alum, cuprous chloride and potassium trioxal atrochromate.

PHYSICAL CHEMISTRY

Module IV
Determination of surface tension and viscosity of liquids

Module V
Heat of neutralisation of a strong acid and a strong base.

Module VI
Solubility curve of KNO₃ or benzoic acid.

Examination Scheme:

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Course Code: BSB 122  Credit Units: 01

Course Contents:

Module I: Algae
Study of Algal types with the help of permanent slides and also by preparing suitable slides as prescribed in the theory course. (Chlamydomonas, Chara, Sargassum, Polysiphonia)

Module II: Fungi
Study of Fungal types with the help of permanent slides and also by preparing suitable slides as prescribed in the theory course. (Eurotium, Morchella, Agaricus)

Module III: Bryophytes
Study of Bryophytes like Riccia, Marchantia, Anthoceros with the help of permanent slides and also by cutting sections and making suitable preparations.

Module IV: Pteridophytes
Study of the pteridophytes like Selanginella, Equisetum, and Marsilea with the help of permanent slides and also by cutting sections and making suitable preparations.

Examination Scheme:

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ENGLISH

Course Objective:
The course is intended to give a foundation of English Language. The literary texts are intended to help students to inculcate creative & aesthetic sensitivity and critical faculty through comprehension, appreciation and analysis of the prescribed literary texts. It will also help them to respond from different perspectives.

Course Contents:

Module I: Vocabulary
Use of Dictionary
Use of Words: Diminutives, Homonyms & Homophones

Module II: Essentials of Grammar - I
Articles
Parts of Speech
Tenses

Module III: Essentials of Grammar - II
Sentence Structure
Subject -Verb agreement
Punctuation

Module IV: Communication
The process and importance
Principles & benefits of Effective Communication

Module V: Spoken English Communication
Speech Drills
Pronunciation and accent
Stress and Intonation

Module VI: Communication Skills-I
Developing listening skills
Developing speaking skills

Module VII: Communication Skills-II
Developing Reading Skills
Developing writing Skills

Module VIII: Written English Communication
Progression of Thought/ideas
Structure of Paragraph
Structure of Essays

Module IX: Short Stories
Of Studies, by Francis Bacon
Dream Children, by Charles Lamb
The Necklace, by Guy de Maupassant
A Shadow, by R.K.Narayan
Glory at Twilight, Bhabani Bhattacharya

Module X: Poems
All the Worlds a Stage  Shakespeare
To Autumn  Keats
O! Captain, My Captain,  Walt Whitman
Where the Mind is Without Fear  Rabindranath Tagore
Psalm of Life  H.W. Longfellow
Examination Scheme:

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</table>

Text & References:

- Madhulika Jha, Echoes, Orient Long Man
- Successful Communications, Malra Treece (Allyn and Bacon)
- Effective Technical Communication, M. Ashraf Rizvi.

* 30 hrs Programme to be continued for Full year
BEHAVIOURAL SCIENCE - I  
(UNDERSTANDING SELF FOR EFFECTIVENESS)

Course Code: BSB 143  
Credit Units: 01

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 its effect on personality  
Building emotional competence

Course Contents:  

Module I: Self: Core Competency  
Understanding of Self  
Components of Self – Self identity  
Self concept  
Self confidence  
Self image

Module II: Techniques of Self Awareness  
Exploration through Johari Window  
Mapping the key characteristics of self  
Framing a charter for self  
Stages – self awareness, self acceptance and self realization

Module III: Self Esteem & Effectiveness  
Meaning & Importance  
Components of self esteem  
High and low self esteem  
Measuring your self esteem

Module IV: Building Positive Attitude  
Meaning and Nature of Attitude  
Components and Types of Attitudes  
Relevance and Importance of Attitudes

Module V: Building Emotional Competence  
Emotional Intelligence – Meaning, Components, Importance and Relevance  
Positive and Negative Emotions  
Healthy and Unhealthy expression of Emotions

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

Examination Scheme:  

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</table>

Text & References:  
- Dressler, David and Cans, Donald: The Study of Human Interaction  
• J William Pfeiffer (ed.) Theories and Models in Applied Behavioural Science, Vol 2, Group (1996); Pfeiffer & Company
Course Code: BSB 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, adjetif, 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
GERMAN - I

Course Code: BSB 145  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: 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 Dipthongs

Module IV: Countries, nationalities and their languages
To make the students acquainted with the most widely used country names, their nationalities 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 colour 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.

Examination Scheme:

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</table>

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 Code: BSB 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.

Examination Scheme:

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C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- Español, En Directo I A
- Español Sin Fronteras
JAPANESE - I

Course Code: BSB 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:

<table>
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<tr>
<th>Components</th>
<th>CT1</th>
<th>CT2</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 Code: BSB 148  Credit Units: 02

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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C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- “Elementary Chinese Reader Part I” Lesson 1-10
BIOCHEMISTRY AND METABOLIC REGULATION

Course Code: BSB 201
Credit Units: 03

Course Objective:
The course aims on understanding of the relationships between structure and function in the major classes of biopolymers. It augurs understanding on central metabolic process and the role of enzymes in modulating pathways. The theoretical background of biochemical systems helps to interpret the results of laboratory experiments.

Course Contents:

Module I
Carbohydrate metabolism-glycolysis pathway and reactions, Glycogen breakdown and synthesis, control of glycogen metabolism, glycogen storage and its diseases, Citric acid cycle -Overview, Metabolic sources of Acetyl Co-A, enzymes and regulation, The amphibolic nature of the Citric acid cycle Electron transport chain and oxidative photophosphorylation -mitochondria and electron transport, phosphorylation and control of ATP production Gluconeogenesis, The glyoxylate pathway, Pentose phosphate pathway

Module II
Lipid metabolism - fatty acid oxidation, ketone bodies, fatty acid biosynthesis, regulation of fatty acid metabolism.

Module III
Amino acid metabolism -Amino acid deamination, urea cycle, amino acids as biosynthetic precursors, biosynthesis of amino acids, Nitrogen fixation

Module IV
Nucleotide Metabolism -structure and metabolism of purines and pyrimidines,

Module V
Classification and nomenclature of enzymes, regulation of enzyme activity, coenzymes-structure and function of coenzyme A; kinetics of enzyme catalyzed reactions; isolation and purification of enzymes ; enzymes in food processing, medicines and production of chemical compounds

Examination Scheme:

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</table>

Text & References:

Text:
- Biochemistry, L. Stryer, W.H. Freeman and Company
- Tools of Biochemistry, T.G. Cooper, John Wiley and Sons Inc.

References:
- Biochemical calculations, I.H. Segal. Publisher, John Wiley and Sons
- Devlin’s Textbook of Biochemistry with Clinical correlations, John Wiley and Sons Inc.
BIOINFORMATICS

Course Code: BSB 202
Credit Units: 03

Course Objective:
The course involves a basic understanding of computer and bioinformatics tools and skills in the field of biology.

Course Contents:

Module I: Computers
General introduction (characteristics, capabilities, generations), software, hardware: organization of hardware (input devices, memory, control unit arithmetic logic unit, output devices); software: (System software; application software, languages -low level, high level), interpreter, compiler, data processing; batch, on-line, real-time (examples from bioindustries: e.g. application of computers in co-ordination of solute concentration, ph, temperature, etc., of a fermenter in operation); internet application.

Module II: Basic Bioinformatics
Introduction to Internet, Search Engines (Google, Yahoo, Entrez etc)

Module III: Biological Databases
Sequence databases (EMBL, GenBank, DDBJ, -UNIPROT, PIR, TriEMBL), 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 IV: Phylogenetic Analysis
Trees-splits and metrics on trees, tree interpretation, Distance – additive, ultrameric and nonadditive distances, tree building methods, phylogenetic analysis, parsimony, tree evaluation, maximum likelihood trees – continuous time markov chains, estimating the rate of change, likelihood and trees: analysis software.
Annotation, comparison of different methods; ESTs – databases, clustering, gene discovery and identification, and functional classification.

Module V: Genome analysis
Annotation, comparison of different methods; ESTs – databases, clustering, gene discovery and identification, and functional classification. Reconstruction of metabolic pathways; Genome analysis, genome anatomy, genome rearrangements with inversions, signed inversions, gene identification, gene expression, expression analysis, gene identification and functional classification.

Examination Scheme:

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</tbody>
</table>

Text & References:

Text:
- Computer Science, J.G. Brookshear, Pearson, Addison Wesley
- Introduction to Bioinformation – T.Attawood

References:
- Introduction to C++ for Engineers and Scientists, Prentice-Hall
- Schaum’s Outline of Introduction of Computer Science, P. Cushman and R. Mata-Toledo, McGraw Hill Trade
- Bioinformatics – Managing Scientific Data, Zoe’ Lacroix and Terence Critchlow
- Bioinformatics – Sequence, Structure and Databanks, Des Higgins & Willie Taylor
- Structural Bioinformatics, Philip E. Bourne, Helge Weissig 2003
Course Code: BSB 203
Credit Units: 03

Course Objective:
The objective of this course is to acquaint the students with the details of gymnosperms, classification of angiosperms and taxonomy which will make a foundation for further studies.

Course Contents:

GYMNOSPERMS

Module I
General characteristics, affinities and classification of Gymnosperms (Chamberlains’ and D.D Pant’s classification)

Module II
Systematic position, occurrence, morphology and development of reproductive structures of the following taxa: 
- *Cycas*, *Pinus*, *Ephedra*, Economic importance of *Cycas*, *Pinus* and *Ephedra*.

TAXONOMY OF ANGIOSPERMS

Module III
Classification as proposed by Bentham and Hooker and Hutchinson, merits, demerits and comparison. Binomial Nomenclature and elementary knowledge of International Code of Botanical Nomenclature.

Module IV
Systematic position, distinguishing characters and economic importance of family: Rutaceae, Cucurbitaceae, Rosaceae, Apocynaceae, Asclepiadaceae, Lamiaceae, Euphorbiaceae, and Poaceae.

Examination Scheme:

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Text & References:

Text:

References:
- Taxonomy, V. Singh & D. K. Jain, Rastogi Publications.
- Botany for degree students – Gymnosperms, P.C. Vashishtha, S. Chand & Co.
- College Botany Vol.2, B.P. Pandey, S. Chand & Co.
- Systematic Botany, S.C. Datta, New Age.
- Introductory Botany, A. Bendre & P. C. Pandey, Rastogi Publication.
Course Code: BSB 204
Credit Units: 03

Course Objective:
The students will acquire knowledge about the compounds of carbon mainly hydrocarbon. They will be acquainted with the methods of qualitative and quantitative analysis of elements of hydrocarbons and methods of preparation of these compounds. They will get knowledge about the behavior of chemical and physical reactions along with electrolysis process.

Course Contents:

ORGANIC CHEMISTRY

Module I
Organic chemistry as chemistry of carbon compounds, Methods of purification, tests of purity: qualitative and quantitative elemental analysis, determination of molecular masses: calculation of Empirical and Molecular formula, Structural formula. Tetrahedral concept of carbon compounds; nomenclature of organic compounds; Isomerism; stereo-isomerism, geometrical and optical isomerism.

Module II
Petroleum: Fractionation, cracking and synthetic petrol.
General methods of preparation and properties of alkanes, alkenes, alkynes, Halogen substituted alkanes (CH₂Cl₂, CHCI₃, CCl₄, CHI₃), Electrophilic substitutions. General study of Cycloalkanes

Module III
Grignard reagent; preparation and uses,
Alcohol; ethanol, propanol, glycerol
Monocarboxylic acids and their simple derivatives, descriptive studies of dicarboxylic acids, viz. malic, oxalic, tartaric, maleic,
General methods of preparation of aliphatic aldehydes and ketones,
Keto-enol tautomerism; aceto-acetic ester and malonic ester.

PHYSICAL CHEMISTRY

Module IV
Chemical equilibrium: Reversible reactions, equilibrium law, equilibrium constant, factors influencing equilibrium states.

Module V
Electrochemistry: Electrolysis, laws of electrolysis, ionisation constant, specific, equivalent and molecular conductance, common ion effect; Hydrogen ion concentration, pH value, Theory of acid base indicators, buffer solutions, hydrolysis of salts and solubility product simple calculations based on these concepts.

Examination Scheme:

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</table>

Text & References:

Text:

References:
- Advanced Organic Chemistry, Bahl & Bahl, S. Chand & Co. Ltd.
- Essentials of Physical Chemistry, Bahl & Tuli, S. Chand & Co. Ltd.
- Simplified course in Physical Chemistry, Madan & Tuli, S. Chand & Co. Ltd.
- Atkin’s Physical Chemistry, Atkin, Oxford Press.
- Physical Chemistry, Vemulapalli, Printice Hall of India
ENVIRONMENTAL STUDIES

Course Code: BSB 205 Credit Units: 04

Course Objective:
The term environment is used to describe, in the aggregate, all the external forces, influences and conditions, which affect the life, nature, behaviour and the growth, development and maturity of living organisms. At present a great number of environment issues, have grown in size and complexity day by day, threatening the survival of mankind on earth. A study of environmental studies is quite essential in all types of environmental sciences, environmental engineering and industrial management. The objective of environmental studies is to enlighten the masses about the importance of the protection and conservation of our environment and control of human activities which has an adverse effect on the environment.

Course Contents:

Module I: The multidisciplinary nature of environmental studies
Definition, scope and importance
Need for public awareness

Module II: Natural Resources
Renewable and non-renewable resources:
Natural resources and associated problems
Forest resources: Use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forests and tribal people.
Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems.
Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies.
Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies.
Energy resources: Growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources, case studies.
Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification.
Role of an individual in conservation of natural resources.
Equitable use of resources for sustainable lifestyles.

Module III: Ecosystems
Concept of an ecosystem
Structure and function of an ecosystem
Producers, consumers and decomposers
Energy flow in the ecosystem
Ecological succession
Food chains, food webs and ecological pyramids
Introduction, types, characteristic features, structure and function of the following ecosystem:
   a. Forest ecosystem
   b. Grassland ecosystem
   c. Desert ecosystem
   d. Aquatic ecosystems (ponds, streams, lakes, rivers, ocean estuaries)

Module IV: Biodiversity and its conservation
Introduction – Definition: genetic, species and ecosystem diversity
Biogeographical classification of India
Value of biodiversity: consumptive use, productive use, social, ethical aesthetic and option values
Biodiversity at global, national and local levels
India as a mega-diversity nation
Hot-spots of biodiversity
Threats to biodiversity: habitat loss, poaching of wildlife, man wildlife conflicts
Endangered and endemic species of India
Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity

Module V: Environmental Pollution
Definition
Causes, effects and control measures of:
a. Air pollution
b. Water pollution
c. Soil pollution
d. Marine pollution
e. Noise pollution
f. Thermal pollution
g. Nuclear pollution

Solid waste management: Causes, effects and control measures of urban and industrial wastes.
Role of an individual in prevention of pollution.
Pollution case studies.
Disaster management: floods, earthquake, cyclone and landslides.

**Module VI: Social Issues and the Environment**
From unsustainable to sustainable development
Urban problems and related to energy
Water conservation, rain water harvesting, watershed management
Resettlement and rehabilitation of people; its problems and concerns. Case studies.
Environmental ethics: Issues and possible solutions
Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case studies.
Wasteland reclamation
Consumerism and waste products
Environmental Protection Act
Air (Prevention and Control of Pollution) Act
Water (Prevention and control of Pollution) Act
Wildlife Protection Act
Forest Conservation Act
Issues involved in enforcement of environmental legislation
Public awareness

**Module VII: Human Population and the Environment**
Population growth, variation among nations
Population explosion – Family Welfare Programmes
Environment and human health
Human Rights
Value Education
HIV / AIDS
Women and Child Welfare
Role of Information Technology in Environment and Human Health
Case Studies

**Module VIII: Field Work**
Visit to a local area to document environmental assets-river / forest/ grassland/ hill/ mountain.
Visit to a local polluted site – Urban / Rural / Industrial / Agricultural
Study of common plants, insects, birds
Study of simple ecosystems-pond, river, hill slopes, etc (Field work equal to 5 lecture hours)

**Examination Scheme:**

<table>
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<th>Components</th>
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**Text & References:**

- Bharucha Erach, The Biodiversity of India, Mapin Publishing Pvt. Ltd., Ahmedabad 380 013, India, Email: mapin@icenet.net (R)
- Clark R.S., Marine Pollution, Clauderson Press Oxford (TB)
- De A.K., Environmental Chemistry, Wiley Eastern Ltd.
- Down to Earth, Centre for Science and Environment (R)
- Hawkins R.E., Encyclopedia of Indian Natural History, Bombay Natural History Society, Bombay (R)
- Mhaskar A.K., Matter Hazardous, Techno-Science Publication (TB)
- Survey of the Environment, The Hindu (M)
- Trivedi R. K. and P.K. Goel, Introduction to air pollution, Techno-Science Publication (TB)
BIOTECHNOLOGY LAB – II (BASED ON BIOCHEMISTRY, BIOINFORMATICS, COMPUTER AND GENETICS - I)

Course Code: BSB 220  Credit Units: 03

Course Contents:

**Module I: Biochemistry**
Estimation of DNA, Estimation of RNA, Estimation of sugar in given solution, Assay of enzyme activity – amylase,

**Module II: Computers**
Handling of computers and Data analysis using Oracle (create, append, delete, pack, display, list count, set, order, index, sort)

**Module III: Bioinformatics**
Pubmed searching, Entrez (meta search engine), Phylogenic software – Phylip, Sequence analysis tools, Multiple sequence analysis Clustal W.

**Module IV: Genetics**
Study of mendalian ratios
Study of bacterial conjugation

Examination Scheme:

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</table>
CHEMISTRY LAB – II

Course Code: BSB 221 Credit Units: 01

Course Contents:

INORGANIC CHEMISTRY

Module I
Qualitative analysis of inorganic mixtures, containing not more than four ionic species (excluding insoluble substances) out of the following:

\[ \text{Pb}^{2+}, \text{Hg}^{2+}, \text{Ag}^{+}, \text{Bi}^{3+}, \text{Cu}^{2+}, \text{Cd}^{2+}, \text{As}^{3+}, \text{Sn}^{2+}, \text{Sn}^{4+}, \text{Fe}^{2+}, \text{Fe}^{3+}, \text{Al}^{3+}, \text{Co}^{2+}, \text{Ni}^{2+}, \text{Mn}^{2+}, \text{Zn}^{2+}, \text{Sr}^{2+}, \text{Ca}^{2+}, \text{Mg}^{2+}, \text{NH}_4^+, \text{K}^+, \text{CO}_3^{2-}, \text{S}^-; \text{SO}_3^{2-}, \text{NO}_2^-, \text{CH}_3\text{COO}^-, \text{F}^-, \text{Cl}^-, \text{Br}^-, \text{I}^-, \text{NO}_3^-, \text{SO}_4^{2-}, \text{C}_2\text{O}_4^{2-}, \text{PO}_4^{3-}, \text{BO}_3^{3-}. \]

Module II
Purification of Organic compounds by crystallization (from water or alcohol) and distillation.

Examination Scheme:

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Course Code: BSB 222 Credit Units: 01

Course Contents:

Module I: Gymnosperm
Study of the Gymnosperms like Cycas, Pinus and Ephedra with the help of permanent slides and also by cutting sections and making suitable preparations.

Module II: Taxonomy
Detailed description and identification of locally available plants of the families as prescribed in theory course.

Examination Scheme:

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</table>
Course Code: BSB 240
Credit Units: 03

Course Objective:
The course is intended to give a foundation of English Language. The literary texts are intended to help students to inculcate creative & aesthetic sensitivity and critical faculty through comprehension, appreciation and analysis of the prescribed literary texts. It will also help them to respond from different perspectives.

Course Contents:

Module I: Vocabulary
Use of Dictionary
Use of Words: Diminutives, Homonyms & Homophones

Module II: Essentials of Grammar - I
Articles
Parts of Speech
Tenses

Module III: Essentials of Grammar - II
Sentence Structure
Subject -Verb agreement
Punctuation

Module IV: Communication
The process and importance
Principles & benefits of Effective Communication

Module V: Spoken English Communication
Speech Drills
Pronunciation and accent
Stress and Intonation

Module VI: Communication Skills-I
Developing listening skills
Developing speaking skills

Module VII: Communication Skills-II
Developing Reading Skills
Developing writing Skills

Module VIII: Written English communication
Progression of Thought/ideas
Structure of Paragraph
Structure of Essays

Module IX: Short Stories
Of Studies, by Francis Bacon
Dream Children, by Charles Lamb
The Necklace, by Guy de Maupassant
A Shadow, by R.K. Narayan
Glory at Twilight, Bhabani Bhattacharya

Module X: Poems
All the Worlds a Stage Shakespeare
To Autumn Keats
O! Captain, My Captain. Walt Whitman
Where the Mind is Without Fear Rabindranath Tagore
Psalm of Life H.W. Longfellow
Examination Scheme:

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</table>

Text & References:

- Madhulika Jha, Echoes, Orient Long Man
- Successful Communications, Malra Treece (Allyn and Bacon)
- Effective Technical Communication, M. Ashraf Rizvi.
Course Code: BSB 243  Credit Units: 01

Course Objective:
To enable the students:
Understand the process of problem solving and creative thinking.
Facilitation and enhancement of skills required for decision-making.

Course Contents:

Module I: Thinking as a tool for Problem Solving
What is thinking: The Mind/Brain/Behaviour
Thinking skills
Critical Thinking and Learning:
Making Predictions and Reasoning
Memory and Critical Thinking
Emotions and Critical Thinking

Module II: Hindrances to Problem Solving
Perception
Expression
Emotion
Intellect
Work environment

Module III: Problem Solving Process
Recognizing and Defining a problem
Analyzing the problem (potential causes)
Developing possible alternatives
Evaluating Solutions
Resolution of problem
Implementation

Module IV: Plan of Action
Construction of POA
Monitoring
Reviewing and analyzing the outcome

Module V: Creative Thinking
Definition and meaning of creativity
The nature of creative thinking
Convergent and Divergent thinking
Idea generation and evaluation (Brain Storming)
Image generation and evaluation
Debating
The six-phase model of Creative Thinking: ICEDIP model

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

Examination Scheme:

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</table>
Text & References:

- Michael Steven: How to be a better problem solver, Kogan Page, New Delhi, 1999
- Geoff Petty: How to be better at creativity; Kogan Page, New Delhi, 1999
- Phil Lowe Koge Page: Creativity and Problem Solving, New Delhi, 1996
Course Code: BSB 244 Credit Units: 02

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 –
Imagine 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
imaginer une conversation téléphonique/un dialogue
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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<tr>
<th>Components</th>
<th>CT1</th>
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C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- le livre à suivre : Campus: Tome 1
GERMAN – II

Course Code: BSB 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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</table>

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: BSB 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 Code: BSB 247  
Credit Units: 02

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 Code: BSB 248
Credit Units: 02

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”.
“Whatish”?? 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.
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C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

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

Course Code: BSB 301
Credit Units: 04

Course Objective:
The objective of the course is to focus on the basic principles of genetics incorporating the concepts of classical, molecular genetics. Compilation is required for recent advances in genetic principles for strong foundation in Biotechnology. The objective of the course is to focus on basic principles of inheritance.

Course Contents:

Module I

Module II
Basic microbial genetics, Conjugation, transformation, transduction and their use in genetic mapping.

Module III
Classical and modern concept of gene, pseudoallelism, position effect, intragenic crossing over and complementation test, Benzers work on rII locus in T4 Bacteriophage.

Module IV

Module V
Sex determination in plant and animal. Non disjunction as a proof of chromosomal theory of inheritance. Sex linked, sex influenced and sex limited inheritance.

Module VI
Extra chromosomal inheritance; cytoplasmic inheritance, Mitochondrial and Chloroplast genetic system.

Module VII
Population genetics; Hardy-Weinberg equilibrium law, Gene and genotype frequencies.

Examination Scheme:

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Text & References:

Text:
- Principles of Genetics, E. J. Gardner, John Wiley & Sons Inc.
- Genetics, P.K. Gupta, Rastogi Publication.

References:
- Concepts of Genetics (Sixth Edition), William S. Klug and Michael R, Cummings, Pearson Education.
- Genetics, M.W. Strickberger, Prentice Hall College Division.
- Genetics, P.J. Russell, Benjamin/Cummings.
- Principles of Genetics, D.P. Snustad & M.J. Simmons, John Wiley and Sons Inc.
MICROBIOLOGY

Course Code: BSB 302 Credit Units: 03

Course Objective:
The course imparts the knowledge of different types of microorganisms that are invisible to our naked eyes. Discovery, origin and evaluation of different forms of bacteria, fungi, protozoa and viruses constitute the basics of biotechnology.

Course Contents:

Module I: History and development of microbiology
Introduction, contribution of Scientists (Leeuwenhoek, Pasteur, Koch etc.), role of microorganisms in transformation of organic matter and in the causation of diseases. Pasteur’s experiments, concept of sterilization, microscopy (optical, TEM and SEM), concept of microbial species and strains; general outline of various forms of micro-organisms.

Module II: Ultra Structure of Prokaryotic cell
Nature of the microbial cell surface, Prokaryotic structure and function - cell envelope, cell wall, cytoplasmic membrane, capsule, surface appendages, cytoplasm and cytoplasmic inclusions, gram positive and gram negative bacteria and endospores.

Module III
Nutritional classification of microorganisms, isolation of auxotrophs (replica plating), analysis of mutations in biochemical pathways, microbial assays for vitamins and antibiotics, strain improvement by selection.

Module IV: Control of microorganisms
Methods of sterilization & disinfection (Physical agents & chemical agents) Antibiotics with special reference to antibacterial & antifungal antibiotics, mode of actions, drug resistance.

Module V: Microbial agents of diseases
Clinically important Bacterial & fungal diseases.

Examination Scheme:

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Text & References:

Text:
- The Microbial World, Roger Y. Stanier, Prentice Hall
- Microbiology, Prescott and Dunn, C.B.S. Publishers

References:
- General Microbiology, R.Y. Stanier, J.L. Ingraham, M.L. Wheelis and P.R. Painter, Macmillian
- Principles of Microbiology, R.M. Atlas, Wm C. Brown Publisher.
- The microbes – An Introduction to their Nature and Importance, P.V. Vandenmark and B.L. Batzing, Benjamin Cummings.
- Microbiology, Tortora, Funke and Chase, Benjamin & Cummings
- Principles of Fermentation Technology, Salisbury, Whitaker and Hall, Aditya Books Pvt. Ltd.
- Industrial Microbiology, Casida, New Age International
MOLECULAR CELL BIOLOGY - I

Course Code: BSB 303
Credit Units: 03

Course Objective:
The aim is to extend understanding of the molecular mechanisms via which genetic informations are stored, expressed and transmitted among generations.

Course Contents:

Module I: Introduction to Molecular Biology

Module II: Molecular basis of life
Structure of DNA; DNA replication in prokaryotes and eukaryotes; DNA recombination molecular mechanisms,

Module III: Insertion elements, transposons and retrotransposons

Module IV: Organisation of genetic material:
Split genes; overlapping genes; pseudogenes; cryptic genes

Module V: Genetic Code
Properties of genetic code, codon assignment, chain termination codons, wobble hypothesis.

Examination Scheme:

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Text & References:

Text:
- Gene VIII, Benjamin Lewin 2005, Oxford University Press
- Molecular Biology of the Cell, B. Alberts, D. Bray, J. Lewis, M. Raff, K. Roberts and J.D. Watson,
- Garland Publishing.

References:
- Concepts of Genetics, W.S. Klug, and M.R. Cummings 2004, Pearson Education
- Genome, T.A. Brown, John Willey & Sons Inc.
- Introduction to Practical Molecular Biology, P.D. Dabre, John Wiley and Sons Inc.
Course Objective:
The objective of this course is to familiarize the students with mechanisms of various physiological activities of higher plants, anatomy and ecology which will help them to understand the various profiles of biotechnology and assessment of environment.

Course Contents:

Module I

Module II

Module III
Photosynthesis: Importance of the process, role of the pigments, light and dark reactions, photophosphorylation and electron transport system, C_3 and C_4 pathway and factors affecting photosynthesis, Respiration: Glycolysis, Krebs cycle, factors affecting respiration.

Module IV

Module V

Examination Scheme:

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Text & References:

Text:
- Ecology & Environment, P.D. Sharma, Rastogi Publications.

References:
- Anatomy of Seed Plants, K. Esau, John Wiley & Sons.
- Plant Physiology and Biochemistry, Prof. H. Srivastava, Rastogi Publications.
CHEMISTRY - III

Course Code: BSB 305  Credit Units: 03

Course Objective:
The students will learn about the various laws and conditions which govern the behaviour of liquid and solution and the phases in which they exist under different conditions.

Course Contents:

INORGANIC CHEMISTRY

Module I
Acid and Bases: Elementary idea of Bronsted -Lowry and Lewis concept of acids and bases (Proton-donor acceptor and electrom donor acceptor systems), Relative strengths of Lewis acids bases and the effect of subsistent and the solvent on them.

Module II
General properties of 3rd elements & Co-ordination Compounds: Molecular compounds, Werners coordination theory, IUPAC system of nomenclature of coordination compounds. Discussion of outer and inner orbit complexes.

Module III
Preparation, properties, uses and structure of the following compounds - Tin Chlorides, hydrazine, hydroxylamine and acids, Oxides, Oxyacids and halides of phosphorus, tartarometric, hydrogen sulphide (analytical applications), Oxides and Oxyacids of sulphur, Oxyacids of chlorine.

PHYSICAL CHEMISTRY

Module IV
Liquids: Vapor pressure, variation of vapour pressure of liquids with temperature (Clausious – Claperon Equation). Surface tension, viscosity, their experimental determination and applications. Parachor, Rheochor and their applications.

Module V

Module VI
Heterogenous equilibria: Phase rule, phase diagrams of water and sulphur system. Nernst’s distribution law, solvent extraction.

Examination Scheme:

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Text & References:

Text:
- Test book of Inorganic Chemistry, P.L. Soni, Sultan Chand & Sons

References:
- Simplified Course in Inorganic Chemistry, Madan & Tuli, S. Chand & Co. Ltd.
- Concise Inorganic Chemistry, J.D. Lee, Black Well Sciences
- Essentials of Physical Chemistry, Bahl & Tuli, S. Chand & Co. Ltd.
- Simplified course in Physical Chemistry, Madan & Tuli, S. Chand & Co. Ltd.
- Atkin’s Physical Chemistry, Atkin, Oxford Press.
- Physical Chemistry, Vemulapalli, Printice Hall of India
BIOTECHNOLOGY LAB – III (BASED ON GENETICS – II, MICROBIOLOGY, AND MOLECULAR CELL BIOLOGY - I)

Course Code: BSB 320  Credit Units: 03

Course Contents:

Module I
Study of gene interaction
Study of chromosome structure & size
Study of Genetics disorder in human

Module II
Aseptic techniques:
Cleaning of glassware
Preparation of media, cotton plugging and sterilization.

Module III
Isolation of microorganisms from air, water and soil samples: dilution, pour plating and colony purification.
Enumeration of microorganisms: total vs. viable counts.

Examination Scheme:

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CHEMISTRY LAB - III

Course Code: BSB 321  Credit Units: 02

Course Contents:

INORGANIC CHEMISTRY

Module I
Gravimetric estimation of barium and $SO_4^{2-}$ as $BaSO_4$ ions, iron as $Fe_2O_3$ and copper as $CuCNS$.

ORGANIC CHEMISTRY

Module II
Detection of functional groups in mono-functional Organic Compounds. (aldehyde, ester, phenol, amine, amides, alcohols.)

Examination Scheme:

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Course Code: BSB 322  
Credit Units: 02

Course Contents:

**Module I: Physiology**
Water, Soil, and Plant relations Demonstration: Permanent and Temporary wilting, seeding growth in clay.  
Experimentation- determination: iso-hypo-and-hyper tonic solution by plasmolytic methods, stomatal frequency by cobalt chloride method, Farmer’s Potometer.  
Photosynthesis: Demonstration- CO₂ factor, light factors (red, blue, green and yellow light.)  
Experimentation- Separations of photosynthetic pigments by thin layer chromatography.  
Respiration – Determination of R.Q.

**Module II: Ecology**
Study of communities by quadrat method to work out frequency and density.  
Measurement of temperature (Soil).  
Demonstration of Soil texture, carbonate, sulphate, pH.  
Biomass estimation, soil moisture percentage.  
A comparative study of plants (with external and internal characters) to water availability.

**Module III: Plant Anatomy**
Anatomy of normal dicot and monocot roots, stems & leaves  
Anatomy of anomalous structure of stems of Bignon, Nyctanthes, Achryanthes, Boerhaavia and Dracaena.

**Examination Scheme:**

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COMMUNICATION SKILLS - I

Course Code: BSB 341
Credit Units: 01

Course Objective:
To form written communication strategies necessary in the workplace

Course Contents:

Module I: Introduction to Writing Skills
Effective Writing Skills
Avoiding Common Errors
Paragraph Writing
Note Taking
Writing Assignments

Module II: Letter Writing
Types
Formats

Module III
Memo
Agenda and Minutes
Notice and Circulars

Module IV: Report Writing
Purpose and Scope of a Report
Fundamental Principles of Report Writing
Project Report Writing
Summer Internship Reports

Examination Scheme:

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</table>

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

Text & References:

- Business Communication, Raman –Prakash, Oxford
- Creative English for Communication, Krishnaswamy N, Macmillan
- Textbook of Business Communication, Ramaswami S, Macmillan
- Working in English, Jones, Cambridge
- Effective Writing, Withrow, Cambridge
- Writing Skills, Coe/Rycroft/Ernest, Cambridge
- Welcome!, Jones, Cambridge
Course Code: BSB 343
Credit Units: 01

Course Objective:
This course aims at imparting an understanding of:
Interpersonal communication and relationship.
Strategies for healthy interpersonal relationship
Effective management of emotions.
Building interpersonal competence.

Course Contents:

Module I: Interpersonal Communication
Importance of Behavioural/ Interpersonal Communication
Types – Self and Other Oriented
Rapport Building – NLP, Communication Mode
Steps to improve Interpersonal Communication

Module II: Interpersonal Styles
Transaction Analysis
Life Position/Script Analysis
Games Analysis
Interational and Transactional Styles
Bridging differences in Interpersonal Relationship through TA
Communication Styles

Module III: Conflict Management and Negotiation
Meaning and Nature of conflicts
Styles and techniques of conflict management
Meaning of Negotiation
Process and Strategies of Negotiation
Interpersonal Communication: Conflict Management and Negotiation

Module IV: Interpersonal Relationship Development
Importance of Interpersonal Relationships
Interpersonal Relationship Skills
Types of Interpersonal Relationships
Relevance of Interpersonal Communication in Relationship Development

Module V: Impression Management
Meaning & Components of Impression Management
Impression Management Techniques
Impression Management Training-Self help and Formal approaches

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

Examination Scheme:

<table>
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</table>
Text & References:

- Julia T. Wood. Interpersonal Communication everyday encounter
- Beebe, Beebe and Redmond; Interpersonal Communication, 1996; Allyn and Bacon Publishers.
FRENCH - III

Course Code: BSB 344  Credit Units: 02

Course Objective:
To provide the students with the know-how
- To master the current social communication skills in oral and 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/personne/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 sais que

Examination Scheme:

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C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:
- le livre à suivre : Campus: Tome 1
Course Code: BSB 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

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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 – III

Course Code: BSB 346  Credit Units: 02

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
JAPANESE - III

Course Code: BSB 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 continuous 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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C – Project + Presentation  
I – Interaction/Conversation Practice

Text & References:

- “Elementary Chinese Reader Part I, Part-2” Lesson 21-30
TERM PAPER

Course Code: BSB 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 consists 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 magazines 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 ideas.

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:
   f) Show evidence of what an author has said.
   g) Avoid misrepresentation through restatement.
   h) Save unnecessary writing when ideas have been well expressed by the original author.
   i) 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:
   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

References
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
University of Hawai'i at Manoa, Honolulu.

**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%
RECOMBINANT DNA TECHNOLOGY

Course Code: BSB 401
Credit Units: 03

Course Objective:
A complete understanding of molecular techniques like DNA sequencing, restriction mapping, PCR for the cloning and expression of genes can be obtained through the course.

Course Contents:

Module I
Purification of DNA from bacterial, plant and animal cells, manipulation of purified DNA.

Module II
Introduction of DNA into living cells.

Module III
Introduction to gene cloning and its uses, tools and techniques: plasmids and other vectors, DNA, RNA, cDNA.

Module IV
Production of proteins from cloned genes: gene cloning in medicine (Pharmaceutical agents such as insulin, growth hormones, recombinant vaccines), gene therapy for genetic diseases.

Module V
Analysis of DNA by Southern blotting, Analysis of RNA by Northern blotting, Analysis of proteins by Western blot techniques, Dot blots and slot blots, RFLP, AFLP.
PCR: Basic principles and its modification application and uses.

Examination Scheme:

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Text & References:

Text:
- Gene cloning and DNA analysis by T.A. Brown

References:
- Recombinant DNA, J.D. Watson et al. W.H. Freeman and Company
- Molecular Biology of gene by Watson, Baker, Bell, Gann, Levine, Losick
- DNA Science by Micklos Freyer
- Principles of Gene manipulation and Genomics by Primrose and Twyman
MICROBIAL TECHNOLOGY

Course Code: BSB 402  Credit Units: 03

Course Objective:
The basic knowledge of Microbiology gained in the previous semester would be applied in the various disciplines like evolution, Immunology & Industrial fermentation.

Course Contents:

Module I
Microbial nutrition and growth - The definition of growth, mathematical expression of growth, growth curve, measurement of growth and growth yields, synchronous growth, continuous culture, Diauxic growth, culture collection and maintenance of cultures.

Module II
Microbial evolution, systematics and taxonomy - new approaches to bacterial taxonomy, classification including ribotyping, ribosomal RNA sequencing, and characteristics of primary domains, taxonomy, nomenclature and Bergey’s manual.

Module III
Host-parasite relationship (Normal micro flora of skin, oral cavity, gastrointestinal tract), types of toxins (Exo, endo, enterotoxins) and their structure and mode of actions, Microbe Interactions with other populations.

Module IV
Microbes in extreme environments: Archae as the earliest forms, thermophiles, psychrophiles, halophiles, alkaliphiles, acidophiles, hyperthermophiles.

Module V
Introduction to industrially important microbes and microbial fermentative products (Production of antibiotics with special reference to penicillin & streptomycin, enzymes, biotransformation of steroids), food products from microbes (Dairy & SCP etc)

Examination Scheme:

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Text & References:

Text:
- The Microbial World, Roger Y. Stanier, Prentice Hall
- Microbiology, Prescott and Dunn, C.B.S. Publishers

References:
- General Microbiology, R.Y. Stanier, J.L. Ingraham, M.L. Wheelis and P.R. Painter, Macmillan
- Principles of Microbiology, R.M. Atlas, Wm C. Brown Publisher.
- The microbes – An Introduction to their Nature and Importance, P.V. Vandenmark and B.L. Batzing, Benjamin Cummings.
- Microbiology, Tortora, Funke and Chase, Benjamin & Cummings
- Principles of Fermentation Technology, Salisbury, Whitaker and Hall, Aditya Books Pvt. Ltd.
- Industrial Microbiology, Casida, New Age International
MOLECULAR CELL BIOLOGY - II

Course Code: BSB 403  Credit Units: 03

Course Objective:
The aim is to extend understanding of the molecular mechanisms via which genetic informations are stored, expressed and transmitted among generations.

Course Contents:

Module I: Structure of prokaryotic and eukaryotic genes
Transcription mechanism in prokaryotes and eukaryotes.

Module II: Translation
Translation mechanisms in prokaryotes and eukaryotes.

Module III: Gene Expression in prokaryotes
Lac operon; regulation- positive and negative control.

Module IV: Eukaryotic gene Expression
Overview of gene expression, polyadenylation, cap formation, RNA degradation.

Module V: Oncogenes and Tumor Suppressor genes
Oncogenes, tumor suppressor genes in humans, role of genes in cancer development.

Examination Scheme:

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Text & References:

Text:
- Gene VIII, Benjamin Lewin 2005, Oxford University Press

References:
- Concepts of Genetics, W.S. Klug, and M.R. Cummings 2004, Pearson Education
- Genome, T.A. Brown, John Willey & Sons Inc.
- Introduction to Practical Molecular Biology, P.D. Dabre, John Wiley and Sons Inc.
IMMUNOLOGY

Course Code: BSB 404 Credit Units: 03

Course Objective:
Role of antibody engineering in biomedical applications and the importance of immuno genetics in disease processes, tissue transplantation and immune regulation are some of the areas of attributes of this course which can help the students to understand the biotechnology related to human kind.

Course Contents:

Module I
Historical perspective of immune system and immunity; Innate and specific immunity.

Module II
Humoral immunity and Clonal selection theory;

Module III
Cell-mediated immunity.

Module IV
The organs and cells of the immune system.

Module V
Histocompatibility: structure of MHC class I, II & III antigens & their mode of antigen presentation, MHC restriction; Antigens & antigenicity;

Module VI
Antibody structure in relation to function and antigen-binding; Types of antibodies and their structures: isotypes, allotypes, idiotypes.

Examination Scheme:

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Text & References:

Text:
- Kuby Immunology, R.A. Goldsby, T.J. Kindt, and B.A. Osborne, Freeman

References:
- Immunology, Roitt, Mosby – Yearbook Inc.
- Basic Immunology, A.K. Abbas and A.H. Lichtman, Saunders W.B. Company
- Fundamentals of Immunology, W. Paul, Lippincott Williams and Wilkins
- Immunology, W.L. Anderson, Fence Creek Publishing (Blackwell).
- Immunology: A Short Course, E. Benjamin, R. Coico and G. Sunshine, Wiley-Leiss Inc.
Course Objective:
To familiarize the students, with basics of Plant embryology and pathology with details of phyto diseases. They will also be acquainted with economic importance of Timber, food, fiber and medicinal plants, current trends in plant breeding programmes will also be explained. These studies will support them for understanding the various aspects of biotechnology.

Course Contents:

Module I
Structure of anther, microsporogenesis and development of the male gametophyte. Structure of Ovule, megasporogenesis and development of the female gametophyte with particular reference to Polygonum type. Fertilisation, Endosperm and embryo onagrad type.

Module II
General symptoms of fungal, bacterial and viral diseases and their control. Systematic position, morphology of the causal organisms, parasite relationship, disease cycles in the following diseases, Loose smut of wheat, Rust of wheat, Citrus canker and yellow vein disease of Bhindi.

Module III

Module IV
Economic importance with special reference to plants yielding:

a) Food: Cereals (Wheat, Maize), Sugarcane, Legumes – (Pigeon pea,), Oil yielding plants (sarson),
b) Common fibre yielding plants - Cotton, Jute.
c) Medicinal Plants – (Papaver somniferum, and Atropa beladona.)
d) Common timber yielding plants – Dalbergia sissio, Tectona grandis.

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Text & References:

Text:
- Economic Botany in the Tropics, S.L. Kochhar, Macmillan
- Plant Pathology – Pathogen and Plant Disease, B.P. Pandey, S.Chand & Company Ltd.

References:
- Embryology of Angiosperm, Singh, Pandey and Jain, Rastogi Publication
- Introduction to Embryology of Angiosperm, A.K. Pandey, CBS Publishers and Distributors
- Principles and Practice of Plant Breeding, J.R. Sharma, Tata McGraw Hill Publishing Company Limited
- Economic Botany of Crop Plants, A.V.S.S. Sambamurty, N.S. Subramanyam, Asiotech Publishers
- Plant Breeding: Theory & Techniques, S.K. Gupta, Agrobios (India)
CHEMISTRY - IV

Course Code: BSB 406 Credit Units: 03

Course Objective:
The objective of this course is to educate the students about the laws of thermodynamics and its applications, tendency of carbon element to form aromatic & non aromatic compounds and their uses.

Course Contents:

ORGANIC CHEMISTRY

Module I: Carbohydrates
Classification of carbohydrates, constitution of glucose and fructose, mutarotation, General reactions of monosaccharide. An overview of disaccharides

Module II
General study of aromatic compounds, orientation of aromatic compounds, aromaticity. Study of preparation and properties of Toluene, Halogen substituted aromatic compounds; Chlorobenzene, benzene diazonium chloride, Phenols, nitrobenzene, aniline.

Module III
General study of aromatic aldehydes and ketones, phenolic aldehydes & ketones, Aromatic carboxylic acids, phthalic acid and salicylic acid. Benzene sulphonic acid, sulphanilic acid

Module IV
Poly aromatic hydrocarbons; preparation and synthesis of Naphalene, alpha and beta napthol. Constitution of heterocyclic compounds for example pyridine and quinolene.

PHYSICAL CHEMICAL

Module V: Chemical Thermodynamics

Module VI: Electrochemistry
Galvanic cells, standard electrode potential, types of electrodes, measurement of pH.

Module VII: Photochemistry

Examination Scheme:

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Text & References:

Text:

References:
- Advanced Organic Chemistry, Bahl & Bahl, S. Chand & Co. Ltd.
- Essentials of Physical Chemistry, Bahl & Tuli, S. Chand & Co. Ltd.
- Simplified course in Physical Chemistry, Madan & Tuli, S. Chand & Co. Ltd.
Course Code: BSB 420  Credit Units: 05

Course Contents:

Module I
Identification of isolated bacteria: Gram staining methods, metabolic characterisation (IMVIC) test.
Growth curve of microorganisms
Antibiotic sensitivity of microbes, use of antibiotic discs.
Testing water quality (BOD, COD & E. coli count)

Module II
Isolation of nuclear DNA (genomic & plasmid DNA)

Module III
Blood film preparation & identification of blood cells
Study of blood groups
Study of ELISA.

Module IV: Embryology
Study of permanent slides of the:
   a) T.S. anther, pollen, germinating pollen
   b) L.S. ovule types
   c) Endosperm
   d) Embryos
   e) L.S. caryopsis
   f) Dissection of embryo

Module V: Plant Pathology
Examination of local diseased plants representing bacterial, viral, fungal parasites. Study of symptoms caused by parasites, study of selected diseased specimen (mentioned under theory) through specimens, temporary presentations.

Module VI: Economic Botany
Identification and comment on the plants and plant products belonging to cereals, pulses, sugarcane, fibre plants, timbers and medicinal plants

Examination Scheme:

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COMMUNICATION SKILLS - II

Course Code: BSB 441  Credit Units: 01

Course Objective:
To teach the participants strategies for improving academic reading and writing. Emphasis is placed on increasing fluency, deepening vocabulary, and refining academic language proficiency.

Course Contents:

Module I: Social Communication Skills
Small Talk
Conversational English
Appropriateness
Building rapport

Module II: Context Based Speaking
In general situations
In specific professional situations
Discussion and associated vocabulary
Simulations/Role Play

Module III: Professional Skills
Presentations
Negotiations
Meetings
Telephony Skills

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:

- Essential Telephoning in English, Garside/Garside, Cambridge
- Working in English, Jones, Cambridge
- Business Communication, Raman –Prakash, Oxford
- Speaking Personally, Porter-Ladousse, Cambridge
- Speaking Effectively, Jermy Comfort, et.al, Cambridge
- Business Communication, Raman –Prakash, Oxford
BEHAVIOURAL SCIENCE - IV
(GROUP DYNAMICS AND TEAM BUILDING)

Course Code: BSB 443
Credit Units: 01

Course Objective:
To inculcate an elementary level of understanding of group/team functions
To develop team-spirit and to know the importance of working in teams

Course Contents:

Module I: Group formation
Definition and Characteristics
Importance of groups
Classification of groups
Stages of group formation
Benefits of group formation

Module II: Group Functions
External Conditions affecting group functioning: Authority, Structure, Org. Resources, Organizational policies etc.
Internal conditions affecting group functioning: Roles, Norms, Conformity, Status, Cohesiveness, Size, Inter group conflict.
Group Cohesiveness and Group Conflict
Adjustment in Groups

Module III: Teams
Meaning and nature of teams
External and Internal factors effecting team
Building Effective Teams
Consensus Building
Collaboration

Module IV: Leadership
Meaning, Nature and Functions
Self leadership
Leadership styles in organization
Leadership in Teams

Module V: Power to empower: Individual and Teams
Meaning and Nature
Types of power
Relevance in organization and Society

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

Examination Scheme:

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</table>

Text & References:

- Organizational Behaviour, Davis, K.
- LaFasto and Larson: When Teams Work Best, 2001, Response Books (Sage), New Delhi
FRENCH - IV

Course Code: BSB 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

Examination Scheme:

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C – Project + Presentation
I – Interaction/Conversation Practice

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

Course Code: BSB 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
SPANISH - IV

Course Code: BSB 446
Credit Units: 02

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

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C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- Español Sin Fronteras (Nivel – Elemental)
JAPANESE - IV

Course Code: BSB 447 Credit Units: 02

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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Text & References:

Text:
• Teach yourself Japanese

References:
• Shin Nihongo no kiso 1
CHINESE – IV

Course Code: BSB 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.

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C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- “Elementary Chinese Reader, Part-2” Lesson 31-38
PLANT BIOTECHNOLOGY

Course Code: BSB 501  Credit Units: 03

Course Objective:
The course aims to make the students understand the basic techniques of plant tissue culture. The application of Plant Biotechnology covers major areas related to commercial applications. Regeneration of plants through *in vitro* techniques offers a practical strategy for micropropagation.

Course Contents:

**Module I: Introduction to in vitro methods**  
Terms and definitions. Beginning of *in vitro* cultures in our country (ovary and ovule culture, *in vitro* pollination and fertilization. Embryo culture, embryo rescue after wide hybridization, and its applications. Endosperm culture and production of triploids.

**Module II: Introduction to the processes of embryogenesis and organogenesis and their practical applications**  
Micropropagation, axillary bud, shoot-tip and meristem culture. Haploids and their applications. Somaclonal variations and applications (Treasure your exceptions).

**Module III: Introduction to protoplast isolation**  

**Module IV: Use of plant cell, protoplasts and tissue culture for genetic manipulation of plants**  
Introduction to *A. tumefaciens*. Tumor formation on plants using *A.tumefaciens* (Monocots vs. Dicots). Practical application of genetic transformation.

Examination Scheme:

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Text & References:

**Text:**
- An Introduction to Plant Tissue Culture, M.K. Razdan, Oxford and IBH Publishing

**References:**
- Plant Biotechnology and Transgenic Plants, K.M.O. Caldenty, W.H. Barz and H.L. Wills, Marcel Dekker
- Plant Tissue Culture: Theory & Practice, S.S. Bhojwani and M.K. Razdan, Elsevier Health Sciences
ANIMAL BIOTECHNOLOGY

Course Code: BSB 502  Credit Units: 03

Course Objective:
The aim of the course is to provide equal importance to areas like in vitro fertilization, animal cell and tissue culture, hormone vaccine and important enzyme production through animal biotechnology.

Course Contents:

Module I
Introduction of animal cell culture substrate, culture media, preservation and maintenance of cell lines.

Module II
Production of monoclonal antibodies. Bioreactors for large scale culture of cells.

Module III
Growth factors promoting proliferation of animal cells (EGF, FGF, PDGF, IL-1, IL-2, NGF, erythropoietin).

Module IV
Transgenic animals. In vitro fertilization and embryo transfer.

Examination Scheme:

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Text & References:

Text:

References:
- Animal Cell Culture Techniques, M. Clynes, Springer Verlag.
- Cell Culture Lab Fax, M. Butler and M. Dawson, Bios scientific Publications Ltd.
- Cell Growth and Division – A Practical approach, R. Basega, IRL Press.
- Comprehensive Biotechnology, Moo-Young, Alan T. Bullm Howard Dalton, Panima Publication.
IMMUNOTECHNOLOGY

Course Code: BSB 503
Credit Units: 02

Course Objective:
Role of antibody engineering in biomedical applications and the importance of immuno genetics in disease processes, tissue transplantation and immune regulation are some of the areas of attributes of this course which can help the students to understand the biotechnology related to mankind.

Course Contents:

Module I
Immunoglobulin gene: genetic basis of reaction of antibody diversity; Effect of T cell functions.

Module II

Module III
Antibodies in targeting therapeutic agents.

Module IV: Hybridoma Technology
Fusion of myeloma cells with lymphocytes, production of monoclonal antibodies and their application

Module V
Tissue and organ transplant

Module VI
Immunity to infections of diseases; vaccines (attenuated and recombinant) and vaccination, Autoimmunity and autoimmune diseases: Hashimoto’s thyroiditis; Myasthenia gravis; Rheumatoid Arthritis, Pernicious anemia, Asthma.

Examination Scheme:

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Text & References:

Text:
- Kuby Immunology, R.A. Goldsby, T.J. Kindt, and B.A. Osborne, Freeman.

References:
- Immunology, Roitt, Mosby – Yearbook Inc.
- Basic Immunology, A.K. Abbas and A.H. Lichtman, Saunders W.B. Company.
- Fundamentals of Immunology, W. Paul, Lippincott Williams and Wilkins.
- Immunology, W.L. Anderson, Fence Creek Publishing (Blackwell).
- Immunology: A Short Course, E. Benjamin, R. Coico and G. Sunshine, Wiley-Leiss Inc.
Course Code: BSB 504  
Credit Units: 02

Course Objective:  
The course helps in developing a detailed understanding of eukaryotic genome complexity and organization. The students will be familiarised with the techniques in Genomics.

Course Contents:  

GENOMICS

Module I  
The origin of genomes.  
Acquisition of new Genes.

Module II  
DNA sequencing-chemical and enzymatic methods.  
The origins of introns.  
Restriction mapping.

Module III  
DNA & RNA fingerprinting.  
The Human Genome.

Module IV  
Phylogeny.  
SAGE, ESTs, AFLP & RFLP analysis.

Examination Scheme:

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Text & References:

Text:  
- Genes & Genomes, Maxine Singer and Paul Berg

References:  
- Bioinformatics: Sequence and Genome Analysis, D.W. Mount, Cold Spring Harbor Laboratory Press
- Genomes II, T.A. Brown
- A Primer of Genome Science, Greg Gibson and Spencer V. Muse
- Database Annotation in Molecular Biology : Principles and Practice, Arthur M. Lesk
- DNA : Structure and Function, Richard R. Sinden
- Recombinant DNA (Second Edition), James D. Watson and Mark Zoller
- Gene Cloning and DNA Analysis – An introduction (Fourth Edition), T.A. Brown
- Essential of Genomics and Bioinformatics, C.W. Sensen, John Wiley and Sons Inc.
- Functional Genomics – A Practical Approach, S.P. Hunt and R. Livesey, Oxford University Press
- Statistical Genomics: Linkage, Mapping and QTL Analysis, B. Liu, CRC Press.
PROTEOMICS

Course Code: BSB 505
Credit Units: 02

Course Objective:
The course helps in developing a detailed understanding of the analysis of Proteome. The major techniques and methods used will be dealt with in detail.

Course Contents:

PROTEOMICS

Module I
Basic principles of protein structure.

Module II: Analysis of Proteome
2D – gel electrophoresis, mass spectroscopy.

Module III
Modeling of three-dimensional structure of a protein from amino acid sequence.
Modeling mutants.
Designing proteins.
Analysis of nucleic acid / protein sequence and structure data, genome and proteome data using web-based tools.

Module IV: Protein – protein interactions
Yeast- two hybrid method, GFP Tags, Proteome- wide interaction maps.

Examination Scheme:

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Text & References:

Text:
- Genes & Genomes, Maxine Singer and Paul Berg
- Genomes & proteomics From protein sequence to function - S R Pennington & M. J. Dunn

References:
- Bioinformatics: From Genomes to Drugs, T. Lengauer, John Wiley and Sons Inc.
- Bioinformatics: Sequence and Genome Analysis, D.W. Mount, Cold Spring Harbor Laboratory Press
- Genomes II, T.A. Brown
- A Primer of Genome Science, Greg Gibson and Spencer V. Muse
- DNA: Structure and Function, Richard R. Sinden
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- Gene Cloning and DNA Analysis – An introduction (Fourth Edition), T.A. Brown
- Essential of Genomics and Bioinformatics, C.W. Sensen, John Wiley and Sons Inc.
- Proteomics, T. Palzkill, Kluwer Academic Publishers
- Statistical Genomics: Linkage, Mapping and QTL Analysis, B. Liu, CRC Press.
BIOTECHNOLOGY LAB – V (BASED ON ANIMAL BIOTECHNOLOGY AND PLANT BIOTECHNOLOGY)

Course Code: BSB 520 Credit Units: 02

Course Contents:

Module I
Sterilization techniques of glass wares & equipments.
Preparation of cotton plugs & culture media.
Preparation and sterilization of different explants.
Inoculation of explants on culture media.

Module II
Culture of plant embryos/seeds.
Callus culture.
Testing of seed viability.

Module III
Culture of animal cell line.
Preparation of competent cells by calcium chloride method.

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Course Contents:

Module I
Electrophoretic separation of plasmid DNA.
Restriction, digestion & ligation of DNA.

Module II
Gene finding tools and genome annotation- Gen Scan, Net Gene, Hmm gene.

Module III
Comparison of two given genomes- Mummer.

Module IV
Homology modeling of 3-D structure from amino acid sequence: SWISS- MODELLER

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COMMUNICATION SKILLS - III

Course Code: BSB 541
Credit Units: 01

Course Objective:
To equip the participant with linguistic skills required in the field of science and technology while guiding them to excel in their academic field.

Course Contents:

Module I
Reading Comprehension
Summarising
Paraphrasing

Module II
Essay Writing
Dialogue Report

Module III
Writing Emails
Brochure
Leaflets

Module IV: Introduction to Phonetics
Vowels
Consonants
Accent and Rhythm
Accent Neutralization
Spoken English and Listening Practice

Examination Scheme:

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

Text & References:

- Effective English for Engineering Students, B Cauveri, Macmillan India
- Creative English for Communication, Krishnaswamy N, Macmillan
- A Textbook of English Phonetics, Balasubramanian T, Macmillan
Course Code: BSB 543
Credit Units: 01

Course Objective:
This course aims at enabling students towards:
Understand the importance of individual differences
Better understanding of self in relation to society and nation
Facilitation for a meaningful existence and adjustment in society
To inculcate patriotism and National pride.
To enhance personal and professional excellence

Course Contents:

Module I: Individual differences & Personality
Personality: Definition & Relevance
Importance of nature & nurture in Personality Development
Importance and Recognition of Individual differences in Personality
Accepting and Managing Individual differences (Adjustment Mechanisms)
Intuition, Judgment, Perception & Sensation (MBTI)
BIG5 Factors

Module II: Socialization
Nature of Socialization
Social Interaction
Interaction of Socialization Process
Contributions to Society & Nation

Module III: Patriotism and National Pride
Sense of Pride and Patriotism
Importance of Discipline and hard work
Integrity and accountability

Module IV: Human Rights, Values and Ethics
Meaning of Human Rights
Human Rights Awareness
Importance of human rights
Values and Ethics- Learning based on project work on Scriptures like Ramayana, Mahabharata, Gita etc

Module V: Personal and Professional Excellence
Personal excellence:
Identifying Long-term choices and goals
Uncovering talent, strength and style
Alan P. Rossiter’s eight aspects of Professional Excellence
Resilience during challenge and loss
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

Examination Scheme:

<table>
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<tr>
<th>Components</th>
<th>SAP</th>
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<th>VIVA</th>
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</table>
Text & References:

- Bates, A. P. and Julian, J.: Sociology - Understanding Social Behaviour
- Dressler, David and Cans, Donald: The Study of Human Interaction
- Robbins O.B.Stephen,: Organizational Behaviour
FRENCH - V

Course Code: BSB 544  Credit Units: 02

Course Objective:
To furnish some basic knowledge of French culture and civilization for understanding an authentic document and information relating to political and administrative life

Course Contents:

Module D:  pp. 131 – 156 Unités 10,11

Contenu lexical :

Unité 10: Prendre des décisions
1. Faire des comparaisons
2. décrire un lieu, le temps, les gens, l'ambiance
3. rédiger une carte postale

Unité 11: faire face aux problèmes
1. Exposer un problème.
2. parler de la santé, de la maladie
3. interdire/demander/donner une autorisation
4. connaître la vie politique française

Contenu grammatical:

1. comparatif - comparer des qualités/ quantités/actions
2. supposition : Si + présent, futur
3. adverbe - caractériser une action
4. pronom "Y"

Examination Scheme:

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C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- le livre à suivre : Campus: Tome 1
GERMAN - V

Course Code: BSB 545 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 and Business Language and Professional Jargon

Course Contents:

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

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

Module III: Reflexive verbs
Verbs with accusative case
Verbs with dative case
Difference in usage in the two cases

Module IV: Verbs with fixed prepositions
Verbs with accusative case
Verbs with dative case
Difference in the usage of the two cases

Module V: Texts
A poem ‘Maxi’
A text Rocko

Module VI: 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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</table>

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 Code: BSB 546  Credit Units: 02

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

Module II
Future Tense

Module III
Presentations in English on
Spanish speaking countries’
Culture
Sports
Food
People
Politics
Society
Geography

Module IV
Situations:
En el hospital
En la comisaria
En la estacion de autobus/tren
En el banco/cambio

Module V
General revision of Spanish language learnt so far.

Examination Scheme:

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C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- Español Sin Fronteras, Greenfield
Course Code: BSB 547  
Credit Units: 02

Course Objective:
To enable the students to converse, read and write language comfortably and be able to converse using different patterns and forms taught throughout. Students are taught and trained enough to get placed themselves in Japanese companies.

Note: Teaching is done in roman as well as Japanese script.

Course Contents:

Module I
Dictionary form of the verbs, Joining of verbs  
Negative form of verbs  
Potential form

Module II
Joining of many actions together  
Usage of dictionary form of the verbs in sentences  
Introducing colloquial language.

Module III
Direct form of the speech, quotations, 
Expressing thoughts  
Actions and reasoning

Module IV
Conclusion  
Receiving and giving things, favour etc.  
Different forms like ‘tara’ form.

Module V
Revision of the whole syllabus

Learning Outcome
➢ Students can speak and use different patterns, ways to describe a particular situation and can converse comfortably in mentioned situations throughout.
➢ Students can appear in the interviews for placements in Japanese companies.

Methods of Private study /Self help
➢ Teaching will be supported by handouts, audio-aids, and self-do assignments and role plays.
➢ 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 Code: BSB 548  Credit Units: 02

Course Objective:
What English words come from Chinese? Some of the more common English words with Chinese roots are: ginseng, silk, dim sum, fengshui, typhoon, yin and yang, T’al chi, kung-fu. 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.
Pronunciation and intonation.
Character writing and stroke order

Module II
Intonation
Chinese foods and tastes – tofu, chowmian, noodle, Beijing duck, rice, sweet, sour….etc. Learning to say phrases like – Chinese food, Western food, delicious, hot and spicy, sour, salty, tasteless, tender, nutritious, god for health, fish, shrimps, vegetables, cholesterol is not high, pizza, milk, vitamins, to be able to cook, to be used to, cook well, once a week, once a month, once a year, twice a week……
Repetition of the grammar and verbs taught in the previous module and making dialogues using it.
Compliment of degree “de”.

Module III
Grammar the complex sentence “suiran … danshi……”
Comparison – It is colder today than it was yesterday…..etc.
The Expression “chule….yiwai”. (Besides)
Names of different animals.
Talking about Great Wall of China
Short stories

Module IV
Use of “huozhe” and “haishi”
Is he/she married?
Going for a film with a friend.
Having a meal at the restaurant and ordering a meal.

Module V
Shopping – Talking about a thing you have bought, how much money you spent on it? How many kinds were there? What did you think of others?
Talking about a day in your life using compliment of degree “de”. When you get up? When do you go for class?
Do you sleep early or late? How is Chinese? Do you enjoy your life in the hostel?
Making up a dialogue by asking question on the year, month, day and the days of the week and answer them.

Examination Scheme:

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</table>

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- “Elementary Chinese Reader ” Part-II Lesson 39-46
SUMMER TRAINING

Course Code: BSB 550  Credit Units: 06

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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Environmentally Biotechnology

Course Code: BSB 601
Credit Units: 04

Course Objective:
The objective of this course is to familiarize the students with different processes and use of microbial technology that can be employed for a cleaner environment. The course also aims to make the students aware of legislation and rules prevalent to control the degradation of our environment.

Course Contents:

Module I
Environmental components, Environmental pollution and its types, Non-renewable and renewable energy resources.

Module II
Conventional fuels and their major impacts: Global warming and greenhouse effect, Global Ozone Problem, Acid rain, Eutrophication, Biomagnification, Concept of clean fuel technology: Biomass energy and biofuels

Module III
Biodegradation and bioremediation of major pollutants
Bioineralisation: Use of microbial technology for mining

Module IV
Treatment of municipal solid and liquid wastes
Environmental impact assessment and Environmental audit

Module V
Bioassessment of Environmental Quality,
Biofertilizers and Biopesticides

Examination Scheme:

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Text & References:

Text:
- Environmental Science, S.C. Santra
- Environmental Biotechnology, Pradipta Kumar Mohapatra

References:
- Environmental Biotechnology – Concepts and Applications, Hans-Joachim Jordening and Jesef Winter
- Waste Water Engineering, Metcalf and Eddy, Tata McGraw hill
- Agricultural Biotechnology, S.S. Purohit
- Environmental Microbiology : Methods and Protocols, Alicia L. Ragout De Spencer, John F.T. Spencer
- Introduction to Environmental Biotechnology, Milton Wainwright
- Principles of Environmental Engineering, Gilbert Masters
- Principles of fermentation Technology, Salisber, Whitaker and Hall
- Industrial Microbiology – Cassida
- Agricultural Biotechnology – S.S. Purohit
- Wastewater Engineering – Metcalf & Eddy.
INDUSTRIAL BIOTECHNOLOGY

Course Code: BSB 602  Credit Units: 04

Course Objective:
The objective of this course is to use microorganism to produce various compounds of commercial interest. The student will be exposed to various techniques available for large scale cultivation of microorganisms.

Course Contents:

Module I
Introduction to fermentation, the fermentation industry, Production process batch and Continuous system of cultivation, Solid-state fermentation

Module II
Selection of industrial microorganisms, media for fermentation, aeration, pH, temperature and other requirements during fermentation, downstream processing and product recovery, food industry waste as fermentation substrate.

Module III
Production of compounds like antibiotics, enzymes, organic acids, solvents, beverages, SCP.

Module IV
Production of fermented dairy products

Module V
Immobilized enzymes systems, production and applications.

Examination Scheme:

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Text & References:

Text:
- Industrial Microbiology – Cassida

References:
- Principles of fermentation Technology, Salisbury, Whitaker and Hall
- Industrial microbiology – Prescott & Duhm.
ENTREPRENEURSHIP DEVELOPMENT

Course Code: BSB 603  Credit Units: 04

Course Objective:
The aim of this course is to develop the understanding of management of entrepreneurship. The objective is to acquaint the students with various aspects of entrepreneurship business.

Course Contents:

Module I
Need, scope and characteristics of entrepreneurship management of self and understanding human behaviour, business ethics, performance appraisal, and (SWOT) analysis.

Module II
Market survey techniques, Criteria for the principles of product selection and development, Elements of Marketing & Sales Management- (a) Nature of product and market strategy (b) Packaging and advertising (c) After Sales Service (d) Pricing techniques.

Module III
Financial institutions, financial incentives, books of accounts and financial statements.

Module IV
Technical feasibility of the project, plant layout & process planning for the product, Quality Control, Critical Path Method (CPM) and Project Evaluation Review Techniques (PERT) as planning tools for establishing SSI

Examination Scheme:

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Text & References:

Text:
- Entrepreneurship: New Venture Creation, David H. Holt

References:
- Patterns of Entrepreneurship : Jack M. Kaplan
ENVIRONMENTAL AND INDUSTRIAL BIOTECHNOLOGY LAB

Course Code: BSB 620
Credit Units: 02

Course Contents:

ENVIRONMENTAL BIOTECHNOLOGY

Module I
Symptomological studies of the impacts of conventional fuel
Comparative and statistical analysis of the pigment content due to air pollution.

Module II
Comparative and statistical analysis of the sugar content as an impact of air pollution
NR activity estimation and its statistical analysis under pollution stress conditions.

INDUSTRIAL BIOTECHNOLOGY

Module III
Production & downstream processing of alcoholic fermentation.

Examination Scheme:

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COMMUNICATION SKILLS - IV

Course Code: BSB 641  Credit Units: 01

Course Objective:
To enhance the skills needed to work in an English-speaking global business environment.

Course Contents:

Module I: Business/Technical Language Development
Advanced Grammar: Syntax, Tenses, Voices
Advanced Vocabulary skills: Jargons, Terminology, Colloquialism
Individualised pronunciation practice

Module II: Social Communication
Building relationships through Communication
Communication, Culture and Context
Entertainment and Communication
Informal business/ Technical Communication

Module III: Business Communication
Reading Business/ Technical press
Listening to Business/ Technical reports (TV, radio)
Researching for Business /Technology

Module IV: Presentations
Planning and getting started
Design and layout of presentation
Information Packaging
Making the Presentation

Examination Scheme:

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<th>CT1</th>
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</table>

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

Text & References:

- Business Vocabulary in Use: Advanced Masculine, Cambridge
- Business Communication, Raman –Prakash, Oxford
- Business Communications, Rodgers, Cambridge
- Working in English, Jones, Cambridge
- New International Business English, Jones/Alexander, Cambridge
BEHAVIOURAL SCIENCE - VI
(STRESS AND COPING STRATEGIES)

Course Code: BSB 643  Credit Units: 01

Course Objective:
To develop an understanding the concept of stress its causes, symptoms and consequences.
To develop an understanding the consequences of the stress on one’s wellness, health, and work performance.

Course Contents:

Module I: Stress
Meaning & Nature
Characteristics
Types of stress

Module II: Stages and Models of Stress
Stages of stress
The physiology of stress
Stimulus-oriented approach.
Response-oriented approach.
The transactional and interactive model.
Pressure – environment fit model of stress.

Module III: Causes and symptoms of stress
Personal
Organizational
Environmental

Module IV: Consequences of stress
Effect on behaviour and personality
Effect of stress on performance
Individual and Organizational consequences with special focus on health

Module V: Strategies for stress management
Importance of stress management
Healthy and Unhealthy strategies
Peer group and social support
Happiness and well-being

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

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Text & References:

- Blonna, Richard; Coping with Stress in a Changing World: Second edition
- Pestonjee, D.M, Pareek, Udai, Agarwal Rita; Studies in Stress And its Management
- Pestonjee, D.M.; Stress and Coping: The Indian Experience
- Clegg, Brian; Instant Stress Management – Bring calm to your life now
Course Code: BSB 644  
Credit Units: 02

Course Objective:
To strengthen the language of the students both in oral and written so that they can:
i) express their sentiments, emotions and opinions, reacting to information, situations;
ii) narrate incidents, events;
iii) perform certain simple communicative tasks.

Course Contents:
Module D: pp. 157 – 168 – Unité 12

Unité 12: s'évader
1. présenter, caractériser, définir
2. parler de livres, de lectures
3. préparer et organiser un voyage
4. exprimer des sentiments et des opinions
5. téléphoner
6. faire une réservation

Contenu grammatical:
1. proposition relative avec pronom relatif "qui", "que", "où" - pour caractériser
2. faire + verbe

Examination Scheme:

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C – Project + Presentation
I – Interaction/Conversation Practice

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

Course Code: BSB 645 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 and Business Language and Professional Jargon

Course Contents:

Module I: Adjective endings
Adjective endings in all the four cases discussed so far
Definite and indefinite articles
Cases without article

Module II: Comparative adverbs
Comparative adverbs as and like

Module III: Compound words
To learn the structure of compound words and the correct article which they take
Exploring the possibility of compound words in German

Module IV: Infinitive sentence
Special usage of ‘to’ sentences called zu+ infinitive sentences

Module V: Texts
A Dialogue: ‘Ein schwieriger Gast’
A text: ‘Abgeschlossene Vergangenheit’

Module VI: Comprehension texts
Reading and comprehending various texts to consolidate the usage of the constructions learnt so far in this semester.

Module VII: 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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<th>Components</th>
<th>CT1</th>
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C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- Wolfgang Hieber, ernziel 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 – VI

Course Code: BSB 646  Credit Units: 02

Course Objective:
To enable students acquire working knowledge of the language; to give them vocabulary, grammar, voice modulations/intonations to handle everyday Spanish situations in Present as well as in Present Perfect Tense with ease.

Course Contents:

Module I
Revision of the earlier modules

Module II
Present Perfect Tense

Module III
Commands of irregular verbs

Module IV
Expressions with Tener que and Hay que

Module V
En la embajada
Emergency situations like fire, illness, accident, theft

Examination Scheme:

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C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- Español, En Directo I A
- Español Sin Fronteras
JAPANESE - VI

Course Code: BSB 647 Credit Units: 02

Course Objective:
To enable the students to converse in the language with the help of verbs and the usage of different sentence patterns, which help them to strengthen the language.
Students are taught and trained enough to get placed in Japanese companies.
Note: The teaching is done in roman as well as Japanese script. 10 more kanjis are introduced in this semester.

Course Contents:

Module I: Polite form of verbs
Expressing feelings with the polite forms of verb.

Module II: Potential form
Ability of doing or not doing something

Module III: Conjunctions
Joining two sentences with the help of shi and mo

Module IV: Intransitive Verbs
Sentence patterns of indirect speech

Module V: Feelings and expressions
Regret, existence etc.

Learning Outcome
➢ Students can speak the language with the use of different forms of verb.

Methods of Private study/ Self help
➢ Hand-outs, audio-aids, assignments and role-plays will support classroom teaching.
➢ Students are encouraged to watch Japanese movies at Japan Cultural and information center.

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C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- Shin Nihon-go no Kiso Lesson No. 26 to 30.
- All vocabulary and topics taught are from the above-mentioned book.
Course Code: BSB 648  Credit Units: 02

Course Objective:
Chinese emperor Qin Shi Huang – Ti who built the great wall of China also built a network of 270 palaces, linked by tunnels, and was so afraid of assassination that he slept in a different palace each night. 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.
Pronunciation and intonation.
Character writing and stroke order.

Module II
Going out to see a science exhibition
Going to the theatre.
Train or Plane is behind schedule.
Indian Economy-Chinese Economy
Talking about different Seasons of the Year and Weather conditions. Learning to say phrases like-spring, summer, fall, winter, fairly hot, very cold, very humid, very stuffy, neither hot nor cold, most comfortable, pleasant …. etc.

Module III
Temperature – how to say – What is the temperature in May here?
How is the weather in summer in your area?
Around 30 degrees
Heating, air-conditioning
Is winter is Shanghai very cold?
Talking about birthdays and where you were born?
The verb “shuo” (speak) saying useful phrases like speak very well, do not speak very well, if speak slowly then understand if speak fast then don’t understand, difficult to speak, difficult to write, speak too fast, speak too slow, listen and can understand, listen and cannot understand … etc.
Tell the following in Chinese – My name is …. I was born in … (year). My birthday is ……… Today is … (date and day of the week). I go to work (school) everyday. I usually leave home at . (O’clock). In the evening, I usually ………. (do what)? At week end, I ………. On Sundays I usually ……………. It is today….. It will soon be my younger sisters birthday. She was born in ….. (year). She lives in ………. (where). She is working (or studying)…… where… She lives in …… (where.)

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C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- Elementary Chinese Reader Part-2,3; Lesson 47-54
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.

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 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>
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<th>Score</th>
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