

**Govt. Digvijay Autonomous P.G. College, Rajnandgaon (C.G.)**

Three Months Value-Added, Certificate Course

**on**

**“Advanced Techniques  
for Soil and Water Analysis”**



**Sponsored By**

**Autonomous Exam Cell**

**Organized By**

**Department Of Chemistry**

**Govt. Digvijay Autonomous P.G. College, Rajnandgaon (c.g.)**

# Govt. Digvijay Autonomous P.G. College, Rajnandgaon (C.G.)

## DEPARTMENT OF CHEMISTRY



Three Months Value-Added, Certificate Course

**"Advanced Techniques For Soil And Water Analysis"**



This is to certify that \_\_\_\_\_ of M.Sc. (final) Chemistry has successfully completed the requirements of 30 hours of three months value-added certificate course on "Advanced Techniques for Soil and Water Analysis" with \_\_\_\_\_ grade, conducted from \_\_\_\_\_ To \_\_\_\_\_ organized by the Department Of Chemistry and sponsored by autonomous exam cell, Govt. Digvijay Autonomous P.G. College, Rajnandgaon (C.G.).

**We extend our best wishes for his/her future endeavors.**

Course Co-ordinator

Head

Exam Controller

Principal

Department of chemistry

Autonomous Cell

**DEPARTMENT OF CHEMISTRY**

**GOVT. DIGVIJAY PG  
AUTONOMOUS COLLEGE,  
RAJNANDGAON (C.G.)**



**SYLLABUS**

**CERTIFICATE COURSE**

**On**

**Advanced Techniques for Soil and Water Analysis**

**2020-21**

**DURATION** : 3 Months

**CERTIFICATE COURSE** : Advanced Techniques for Soil and  
Water Analysis

**MARKS DISTRIBUTION**

**THEORY PAPER** :

Maximum marks = 50 marks

**PRACTICAL WORK** :

One Major experiment = 20 Marks

One Minor experiments = 10 Marks

Sessional = 10 Marks

Viva = 10 Marks

**Total** = **50 Marks**



**DEPARTMENT OF CHEMISTRY  
GOVT. DIGVIJAY PG AUTONOMOUS COLLEGE, RAJNANDGAON**

**CERTIFICATE COURSE  
On  
Advanced Techniques for Soil and Water Analysis**

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**Max. Marks : 50**

**Soil Analysis**

Introduction, Sampling, Analysis of soil moisture, PH, Total nitrogen, phosphorus, lime, manganese, sulphur and alkali salts, analysis of micro and macronutrients, effects on plant and animal health

**Water Analysis**

Introduction, Sources of water pollution, Sampling techniques, water quality parameters dissolved oxygen, biochemical oxygen demand, solid metal, content of chloride, sulphate, nitrate and microorganism, water quality standards. Analytical method for measuring BOD, DO, COD, residual chloride and chloride, nitrate, sulphate, fluorides, phosphates, Hardness

**Atomic Absorption Spectroscopy**

Physical principles, individual steps of an analytical method, techniques of atomic absorption spectrometry, detection of individual elements for Cadmium (Cd), Calcium (Ca), Magnesium (Mg), Manganese (Mn), Iron (Fe), Zinc (Zn)

DEPARTMENT OF CHEMISTRY  
GOVT. DIGVIJAY PG AUTONOMOUS COLLEGE, RAJNANDGAON

CERTIFICATE COURSE  
On  
Advanced Techniques for Soil and Water Analysis

LABORATORY COURSE

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Max. Marks : 50

**Major experiments**

Determination of metal ions e.g.  $\text{Na}^+$ ,  $\text{K}^+$ ,  $\text{Ca}^{2+}$ ,  $\text{Mg}^{2+}$ ,  $\text{Fe}^{3+}$ ,  $\text{Cu}^+$ ,  $\text{Zn}^{2+}$ ,  $\text{Pb}^{2+}$ , etc.

Determination of anions e.g.  $\text{SO}_4^{2-}$ ,  $\text{NO}_2^-$ ,  $\text{PO}_4^{3-}$ ,  $\text{Cl}^-$ ,  $\text{F}^-$ , etc.

**Minor experiments**

Determination of soil moisture

Determination of pH, colour, turbidity, conductivity, acidity,

alkalinity Determination of DO, COD, BOD,

Determination of Hardness of water samples

code - password  
code - username

Govt. Digvijay Auto. P.G. College

Rajnandgaon

Department Of English

**Syllabus : 2020-21**

**ADD-ON COURSE**

**IN**

**SPOKEN ENGLISH AND CREATIVE WRITING**

## ADD-ON COURSE

### THREE YEAR COURSE IN SPOKEN ENGLISH AND CREATIVE WRITING

#### FIRST YEAR- CERTIFICATE COURSE

Total: 100+100

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<b>Paper I</b>	<b>100 marks</b>
<b>Unit I:</b>	<b>15</b>
Meeting People, My Family, Asking Questions, Colours around You, Holiday Getaways, Home Sweet Home Need for English Communication, Pronunciation of Consonant Sounds, Intonation & Modulation (Facial Expressions), Vocabulary List	
<b>Unit II:</b>	<b>15</b>
It's My Life, Food for Thought, Making Friends, Buying Things, At the Park, Home Improvement, Pronunciation of Vowel Sounds	
<b>Unit III:</b>	<b>15</b>
The Calendar, Time Gone by, Know Your Planet, What Did You Do? Going Places, Do's & Don'ts. Nouns, Pronouns, Verbs, Adverbs, Articles, Adjectives- their uses.	
<b>Unit IV:</b>	<b>15</b>
Parts of the Body, Better Than the Best, A Look into the Future, How Do You Feel?, Leisure Time, Who's This? Subject Verb Agreement, Vocabulary List, Preposition, Conjunction, Interjection.	
<b>Unit V</b>	
<b>(A) General Principles of Writing:</b>	<b>30</b>
Birth of Writing, Types of Writing, Substance of Writing, Techniques to Achieve Lucidity & Direction in Writing, Authenticity in Writing.	
<b>(B) Literary Genres: Poetry, Prose, Drama, Fiction, Short Stories, One-Act Play, Biography, Autobiography.</b>	<b>10</b>

**Paper II**

**100 marks**

<b>Internal Assessment</b> –Continuous Internal Assessment through Practice in Language Lab	<b>50</b>
<b>External Assessment:</b> Final Practical Exam in Language Lab (2 Hours)	<b>50</b>

**LIST OF REFERNCE BOOKS**

**CREATIVE WRITING**

1. “The art of Fiction: Notes on Craft for young writers.”- John Gardiner
2. “From Where your Dream; The Process of Writing Fiction”- Robert Olen Butter.
3. “The Story of Writing”- Donald Jackson.
4. “What to Tell and How to Tell it”-Edna Lyman.
5. “Writer’s Workshop: Techniques in Creative Writing”-Barry Maybury

**SPOKEN ENGLISH**

- 1.“English in situations” by R.O. Neill (OUP).
2. “What to say when” Ed: Vioin Huggins (BBO London).
- 3.“Improve your English: English in Everyday Life”- Stephen Brown and Ceil Lucas

**APPROVED BY THE BOARD OF STUDIES ON ...03.09.2020**

<b>NAME</b>	<b>IN THE CAPACITY OF</b>	<b>SIGNATURE</b>
Dr. Anita Shankar	Chairman	Anita
Dr. Mercy George	Subject Expert (V C Nominee)	} Virtual consent received
Dr. G A Ghanshayam	Subject Expert (Principal Nominee)	
Dr. Rashmi Dubey	Subject Expert (Principal Nominee)	
Dr. Aaftaab Aman	Advisor (Syllabus Committee)	
Mr. Chandan Soni	Meritorious Ex Student	

SECOND YEAR- DIPLOMA COURSE

Total -100+100

Paper I

100marks

**Unit I:**

15

Communication:

Types of Communication, Elements of Communication, Process of Communication.

**Unit II:**

15

Tense (Present, Past & Future)

Introductory Speeches, Thanks Giving Speeches, Useful Vocabulary for Formal & Informal Letters

**Unit III:**

15

Simple, Compound & Complex Sentence, Modals

Offering Encouragement to Somebody

**Unit IV:**

15

Direct & Indirect Speech, Active & Passive Voice

Congratulations & Good Wishes

**Unit V**

Basic Elements of Short Stories

20

Children Literature (The Jungle Book, Snow White, Alice in Wonderland)

20



## Paper II

100 marks

Internal Assessment: Continuous Internal Assessment through Practice in Language Lab	50
External Assessment: Final Practical Exam in Language Lab (2 hours)	50

### LIST OF REFERENCE BOOKS

#### CREATIVE WRITING

1. "Short Story Techniques"- John Baland
2. "Adventure, Mystery and Romance"- John Cawetti
3. "Writing Fiction: A Guide to Narrative Craft"- Janet
4. "The Craft of Children's Writing"- Judith Newman
5. "Becoming a Writer"- Dorothea Brande

#### SPOKEN ENGLISH

1. "Improve your English: English in the Work Place"- Stephen Brown and Ceil Lucas.
2. "Success with English: The Penguin Courses"- Alexander Baird.
3. "English Language Learning Programme"- Prakash Books.
4. "LongMan Student Grammar of Spoken and Written English"- Douglas Biber, Susan Conrad and Geoffrey Leech.

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Dr. Anita Shankar	Chairman	ANITA
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Dr. G A Ghanshayam	Subject Expert (Principal Nominee)	
Dr. Rashmi Dubey	Subject Expert (Principal Nominee)	
Dr. Aaftaab Aman	Advisor (Syllabus Committee)	
Mr. Chandan Soni	Meritorious Ex Student	

**THIRD YEAR- ADVANCED DIPLOMA COURSE**

Total-100+100

**Paper-I**

**100 marks**

**Unit I:**

**15**

Transformation of Sentences; Synthesis of Sentences, Register and Style

**Unit II:**

**15**

Facing Group Discussions, Interviews; Preparing good Resume and presenting it before the Interview Team, Role of language in Personality Development

**Unit III:**

**15**

Public Speaking & Presentation, Use of Idioms in Spoken English, Introduction to Speech

**Unit IV:**

**15**

How to Pronounce Correctly, Mastering Spoken English, Effective Oral Communication.

**Unit V: (A) Writing for Media, Radio and Television**

**20**

Principles & Methods of Effective Writing, Radio and its Potential, Radio talks, Interviews and Discussions, Television and its Potential, Advertising and Media, Newspaper Reports

**(B) Basic Elements of Poetry (Themes, Structures, Imagery, Symbols, Language, Rhythm),  
Appreciating Indian Writings in English (Jayant Mahapatra , APJ Kalam's Ignited Minds, R.K.  
Narayan's Swami & Friends)**

**20**



Paper II

100 marks

Internal Assessment: Continuous Internal Assessment through Practice in Language Lab	50
Project Work	50

LIST OF REFERNCE BOOKS

CREATIVE WRITING

- 1.“Understanding Poetry”-Brooks, Cleanth and Warren Penn
- 2.“The Making of a Poem”- Ted Hughes
- 3.“The Poetic Image”- Day C. Lewis
- 4.“Radio Power”- Julian Hale
- 5.“Writing for Television”-Sir Basil Barlett

SPOKEN ENGLISH

- 1.“Spoken English learned Quickly”-Lynn Lundguist
- 2.“Fluent English”- Living Language.
- 3.“English Language Learning Programme”- Prakash Books.

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GOVT. DIGVIJAY AUTONOMOUS P.G. COLLEGE  
RAJNANDGAON (C.G.)

ACINFT01



*DEPARTMENT OF COMPUTER SCIENCE*

SYLLABUS

OF

**Add On Course**

**B.Sc.(Information Technology)**

**SESSION- 2019-20 / 2020-21**



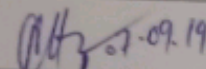
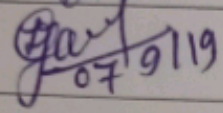
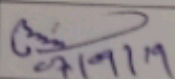
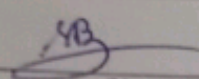
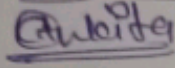
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RAJNANDGAON (C.G.)

DEPARTMENT OF COMPUTER SCIENCE



Session 2019-20 / 2020-21

List of Members of Board of Studies

S.No.	Name of Member	Nominee Type	Signature
1.	Mr. Raju Khunttey	Chairman	 07-09-19
2.	Prof. L.K. Gavel	V.C. Nominee	 07/9/19
3.	Dr. Vinod Patle	Principal Nominee	
4.	Prof. Santosh Kumar Miri	Principal Nominee	 07/9/19
5.	Mr. Bhisim Dewangan	Adviser Member	 SB
6.	Miss T. Ankita Rao	Ex-Student	 Ankita



**INFORMATION TECHNOLOGY**  
Add-on Course-Information Technology  
Eligibility for B.Sc. Students-



**OBJECTIVES**

The benefits of career-oriented can be extended to regular students. Education plays very vital in each and every aspect of life. The aim of college is to bring the quality education to the students in every aspect of life with view and looking at the future of the Information Technology.

**Details of Add-on course (Certificate/Diploma/Advance Diploma)**

1. The Course will be of 20 credits is equal to 200 marks.
2. Paper -1 will be 75 marks = 6 credits.
3. Paper -2 will be 75 marks = 6 credits.
4. Field work/Project work/Training/Practical & Viva will be 50 Marks = 8 credits.
5. Field work & Training on IT will be 10 marks.
6. Project work will be 10 marks.
7. Practical marks will be 25 marks.
8. Viva will be 5 marks.
9. Each credit will have 15 hrs. Of workload out of which 8 credits should be field work/project work/training/Practical and Viva on IT.
10. Each Theory Paper will be 6 credits i.e  $2 \times 6 = 12$  credits for 2 papers.
11. Each Unit will be 1.2 credits
12. Each credit will have 15 hrs. Of workload.
13. 8 credits will be field work/project work/training/practical i.e.  $8 \times 15$  hrs. = 120hrs.
14. Paper I & Paper 2 will be 90 hrs. For each unit =  $90/5 = 18$  hrs.

*Paul*  
07/07/19

*Subita*

*7/10/19*

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ACINFT-01



INFORMATION TECHNOLOGY

2019-20/2020-21

Add-on Course-Information Technology  
Eligibility for B.Sc. Students Along with B.Sc.-I

Paper-1

**Fundamental of IT & PC Software**

Final Year : Certificate Course Total Marks=75  
Theory Paper (6 Credits)  
Paper-1 : Fundamental of IT & PC Software

INFTT 101



- Unit-1 Introduction to Computer and its Concept, General architecture of computer. Usage and benefits of computer, Application of computer. Input and output devices.
- Unit-2 **Introduction to Power Point:** Creating a presentation, Modifying Visual Elements, Adding objects, Applying. Transitions, animations and linking, Preparing handouts presenting slide show.
- Unit-3 Introduction to Windows, feature of Windows, Windows hardware requirement for running various version of windows. Window Accessories –Calculator, Notepad, WordPad, Paint, My Computer, Recycle bin, Task bar, Desktop. Types and anatomy of windows, using program manager, creating and using file manager accessories.
- Unit-4 Introduction Word Processing, Advantages of MS word Processing, Introduction to installation. Editing a file using paragraph style. Newspaper style columns using macros advance word processing header & footer, finding text setting up printer. Mail Merge and other application, mathematical calculator. Table handling.
- Unit-5 Introduction to Spreadsheet, Defining and Advantages of Electronics Worksheet, working on spreadsheet, range and related operations. Setting saving erasing a worksheet in graph creation, Types of graph, creating chart sheet 3D. column charts moving and changing the size of chart printing the chart.

**TEXT & REFERENCE BOOK-**

1. PC Software -Ravi Taxli
2. Computer Fundamental -P.K.Sinha
3. Computer Fundamental -Nagp

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**INFORMATION TECHNOLOGY**

**2019-20/2020-21**

Add-on Course-Information Technology  
Eligibility for B.Sc. Students Along with B.Sc.-II

**Paper-2**

**Object Oriented Programming in C++**

Final Year : Diploma Course

Total Marks=75  
(6 Credits)

Theory Paper

Paper- 2 : Object Oriented Programming in C++

INFTT - 202



- Unit-1 Introduction to object-Oriented Programming(OOP), Advantages of OOP, The object-oriented approach, Concept or features of Object Oriented Programming: Object, Classes, Inheritance, Reusability, Polymorphism, Encapsulation, Data abstraction & Data biding, Difference between procedure oriented Programming Vs Object- oriented programming.
- Unit-2 Object Classes & its declaration, Using the class. Inside or side method of class declaration, Nesting of class, Function types , User defined function, Object as a function argument, using array as class members, Control structure like of else nested if.....else, switch case, and other looping statements like for loop, while loop, do while loops with example.
- Unit-3 Constructor & Destructors, using constructor's will all its types copy constructor, Parameterized constructor and default constructor & destructors, passing arguments in function passing constant passing value reference argument returning by reference Inline function, function overloading .
- Unit-4 Inheritance with all its type, multiple inheritances, multilevel with all its type and hybrid multiple inheritance static member function, friend function Base class, derived class Access specifies protected string.
- Unit-5 Operator overloading & Pointer, Pointer: & and \* Operator pointer variables, Pointer to Pointer, void pointer, pointer and array pointer & function, pointer to object, pointer & string, virtual function virtual member function operator overloading.

**REFERENCE TEXT BOOKS**

1. Programming in C++ : E. Balagruswami
2. Mastering in C++ : Venu Gopal
3. Let us C++ : Y.Kanetkar

**PRACTICAL WORK**

1. The sufficient practical work should be done for understanding the paper.
2. At least five programs on each unit from unit-II to unit-V be prepared.
3. All practical works should be prepared in from of point outs & be evaluated while practical Examination.

07/09/19

Gurkita

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ACINFT 03

**INFORMATION TECHNOLOGY**  
**2019-20 / 2020-21**

Add-on Course-Information Technology  
Eligibility for B.Sc. Students Along with B.Sc.-III

**Paper-I**

**Digital Organization & Architecture**  
**Advanced Diploma Course**

Final Year :  
Theory Paper  
Paper-1 :

**Digital Organization & Architecture**

Total Marks=75  
(6 Credits)

INFTT 30



- Unit-1 Combination & Sequential circuits, Half adder & Full adder, Full subtractor, Multiplexer and De-multiplexer, RAM & ROM working.
- Unit-2 Sequential logic-Flip Flops-RD,D,JK & T-flip Flop, Registers, counters, shift register, Bidirectional register, Synchronous counter, Encoder and Decoder.
- Unit-3 Central Processing Unit-Introduction, General Register organization, stack organization, data transfer and manipulation-data transfer instruction, data manipulation instruction, shift instruction, RISC.
- Unit-4 Input/output organization-Peripheral devices, Input-Output Interface, Asynchronous data transfer, modes of transfer, Direct Memory Access.
- Unit-5 Microprocessor-Introduction, 8085 block diagram and its function, addressing modes, Microprocessor Instruction set and computer language, Data transfer modes.

**TEXT & REFERENCE BOOK-**

1. Digital organization and Architecture : By Morris Mano
2. Microprocessor Architecture, Programming & Application with the 8085 :  
By ramesh S.Gaonkar

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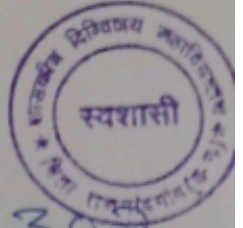
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**INFORMATION TECHNOLOGY**  
**2019-20 / 2020-21**

Add-on Course-Information Technology  
Eligibility for B.Sc. Students Along with B.Sc.-III

**Paper-2**  
**Fundamental of Data Structure**



Final Year : Advanced Diploma Course  
Theory Paper : Fundamental of Data Structure  
Paper-2 :

Total Marks=75  
(6 Credits)

INFTT-302

- Unit-1 Introduction to Data Structure-The concept of Data structure, Abstract data structure , Analysis of Algorithm.  
Stack and Queues –Introduction to stack, Stack application –Infix ,Post fix, primitive operations on stack, Introduction to queues, primitive operations on the queue, circular queue, De-queue.
- Unit-2 Linked list-Introduction to the linked list, linked list, of stack, linked list of queue, doubly linked list.
- Unit-3 Trees- Basic terminology, Binary trees, tree representation as array, Traversal of binary trees- In order, Pre Order & Post Order, Threaded Binary tree, & Height balanced representation of B+ & B\* trees.
- Unit-4 Searching & Sorting- Sequential search, Binary search, Insertion Sort, selection sort, quick sort, bubble sort, heap sort.
- Unit-5 Tables & Graphs-Hash table, collection resolution techniques, Introduction to graph, terminology, graph traversal Depth first and Breadth first search.

**TEXT & REFERENCE BOOK-**

1. Fundamentals of Data structure: By S. Sawhney & Horowith.
2. Data structure : By Trembly & Sorrenson

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07/09/19

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Subita

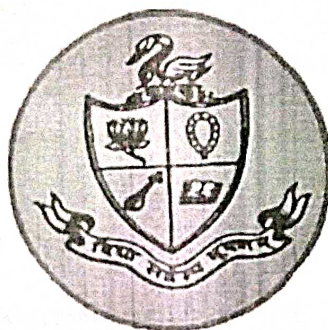
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DEPARTMENT OF CHEMISTRY  
GOVT. DIGVIJAY PG AUTONOMOUS COLLEGE RAJNANDGAON



Food Science and Quality Control

Vocational / Add-on Course

Syllabus for B.Sc. Part-I

Theory Paper	Title of Paper	Duration	Max. Marks	Min. Marks
Paper-I	Basic Nutrition	3hr	75	25
Paper-II	Food Microbiology sanitation & Hygiene	3hr	75	25
Practical		4hr	50	17

Approved by Board of Study for 2019-20

*Handwritten signatures and dates:*  
A. K. Singh  
R. S. Singh  
24/7/19  
24/07/19  
R. S. Singh  
Sheetal

**Department of Chemistry**  
**Govt. Digvijay PG Autonomous College Rajnandgaon**  
Add-On Course - Food Science and Quality Control  
Eligibility for B.Sc. students along with B.Sc. Part – I

**PAPER-I**  
**Basic Nutrition**

First Year : Certificate Course  
Theory Paper – I : Basic Nutrition  
Each Unit has 1.2 Credits



**Paper – I**  
**BASIC NUTRITION**

**Unit I : Introduction to Nutrition**

Food as a source of nutrients, function of foods, definition of nutrition, nutrients, adequate, optimum and good nutrition, mal- nutrition, inter-relationship between nutrition and health, visible symptoms of good health, food guide, use of food in body, digestion, absorption, transport, utilization of nutrients in the body.

**Unit II : (a) Water** : As a nutrient, function source, requirement, water balance, effect of deficiency.

**(b) Minerals** : Calcium, iron, iodine, fluorine, sodium, potassium deficiency.

**(c) Carbohydrates**: Definition, classification, property, food sources, function, storage in body, test of carbohydrates.

**Unit III : (a) Lipids** : Nomenclature, classification, physical aspects, emulsions and emulsifier, chemistry of fat and oil processing.

**(b) Vitamins** : Classification, units of measurement, sources, functions and deficiencies about vitamin A, D, E, ascorbic acid, riboflavin, niacin, vitamin B6, B12, folic acid.

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T. K. ...  
Dr. ...  
S. B. ...  
R. S. ...  
21/07/19  
Sheetal



**Unit IV : (a) Enzymes :** Nomenclature, specificity, kinetics, factors influencing enzyme activity, controlling enzyme action.

**(b) Energy :** Unit of energy, energy value of food. The body needs for energy, B.M.R. activity.

### **Unit V : Amino Acids, Peptides and Proteins**

Nomenclature, Classification, essential and non-essential amino acids, sources of amino acids and proteins, protein deficiency.

### **References**

1. Guthrie, Hele, Andrews, Introductory Nutrition, 6<sup>th</sup> Ed. Loves, Times Mirror/Mosby College, 1988.
2. Mudambi S.R., Rajgopal M.V., Fundamental of Foods and Nutrition, 2<sup>nd</sup> Ed., Wiley Eastern Ltd. 1990.
3. Swaminathan S., Advanced text book of Food Nutrition Vol II, 2<sup>nd</sup> Ed., 1985.
4. Willson, E. Principle of Nutrition, 4<sup>th</sup> Ed., New York, John Wiley & Sons, 1979.

*Ar*  
*DL*  
*24/09/19*  
*Sheetal K. S. Ph.*  
*Pr*

**Department of Chemistry**  
**Govt. Digvijay PG Autonomous College Rajnandgaon**  
Add-On Course - **Food Science and Quality Control**  
Eligibility for B.Sc. students along with B.Sc. Part – I

**PAPER-II**

**FOOD MICROBIOLOGY, SANITATION & HYGIENE**

First Year : Certificate Course  
Theory Paper – II : Food Microbiology, Sanitation & Hygiene  
Each Unit has 1.2 Credits



**Paper – II**

**FOOD MICROBIOLOGY, SANITATION & HYGIENE**

**Unit I**

1. Introduction to Microbiology & its relevance to everyday life. General morphology of micro-organisms. General characteristics of bacteria, fungi, virus, protozoa, algae.
2. Control of micro-organisms, effect of environmental factors on growth of micro-organism. pH, water activity, oxygen availability, temperature and others.

**Unit II**

1. Microbiology of different food spoilage and contamination, sources, types, effects on the following : (a) Cereals & cereal products, (b) Sugar & Sugar products, (c) vegetables & fruit, (d) meat & meat products, (e) fish & other sea foods, (f) egg & poultry, (g) milk & milk products, (h) canned food.
2. Environmental microbiology, water, air, soil & sewage

**Unit III**

1. Microbial intoxication and infections : Sources of contamination of foods. Toxin production & physiological actions. Sources of infection of foods by pathogenic organisms : symptoms & methods of control.
2. Beneficial effects of micro-organisms
3. Relevance of microbiological standards, food safety.

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## Unit IV

1. The relation of micro-organisms to sanitation, effect of micro-organisms on foods borne illness : Bacteria, virus, moulds, yeast & parasites.
2. Other food hazards : Chemicals, antibiotics, hormones
3. Metal contamination : Poisonous foods
4. Foods contamination : Sources & transmission, water, air, sewage & soil as reservoir of infection & work of spread.

## Unit V

1. Importance of personal hygiene of food handler : Habits, clothes, illness, education of food handling in handling and serving food.
2. Safety in food procurement, storage handling and preparation control of spoilage-safety of left to left, own food.
3. Cleaning methods : Sterilization and disinfections : products & methods, use of detergents. heat, chemical test for sanitizer strength.
4. Sanitation, kitchen design, equipments and system : structure & layout of food premises. maintaining clean environment, selecting & installing, cleaning equipment.
5. Waste product handling : Planning for waste disposal.

## References

1. Frazier. W.C. Food Microbiology, 4<sup>th</sup> Ed. McGraw Hill, New York, 1988.
2. Kawata K. Environmental sanitation in India, Lucknow Pub. House, 1963.
3. Pelezar H.J. and Rober D. Microbiology, 2<sup>nd</sup> Ed. McGraw Hill, New York, 1968.
4. Banwart G.T. Basic Food Microbiology, CBS Pub, New Delhi, 1987.
5. Jay J.H. Modern Food Microbiolgy, CBS Pub, New Delhi.

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Department of Chemistry  
Govt. Digvijay PG Autonomous College Rajnandgaon  
Add-On Course - Food Science and Quality Control  
Eligibility for B.Sc. students along with B.Sc. Part - I



First Year : Certificate Course

Details of Practical/Experiments/Field Work/Training/Sessional Total Marks 50  
(Concerned with two theory papers) (08Credits)

1. Practical/Experimental Work will be of 25 marks
2. Sessional work will be of 10 marks
3. Field work & training will be of 10 marks
4. Viva will be of 5 marks

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D. S. Singh  
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R. S. Singh  
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DEPARTMENT OF CHEMISTRY  
GOVT. DIGVIJAY PG AUTONOMOUS COLLEGE RAJNANDGAON

Food Science and Quality Control

Vocational / Add-on Course

Syllabus for B.Sc. Part-II



Theory Paper	Title of Paper	Duration	Max. Marks	Min. Marks
Paper-I	Food Preservation sensory evaluation and Food packaging	3hr	75	25
Paper-II	Post Harvest technology	3hr	75	25
Practical		4hr	50	17

Approved by Board of Study for 2019-20

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**Department of Chemistry**  
**Govt. Digvijay PG Autonomous College Rajnandgaon**  
Add-On Course - Food Science and Quality Control  
Eligibility for B.Sc. students along with B.Sc. Part – II

**PAPER-I**  
**FOOD PRESERVATION, SENSORY EVALUATION**  
**&**  
**FOOD PACKAGING**



**Unit I**

1. Basic concept of food preservation
2. Preservation at home and community level
3. Principles of food preservation

**Unit II**

1. Spoilage of food
2. Temporary & permanent methods of food
3. Nutritive value of preserved food

**Unit III**

1. Palatability of food and the measurement of its accepted sensory testing
2. Sensory analysis
3. Sensory characteristics of food

**Unit IV**

1. Factors influencing sensory measurements
2. Altitude, motivation, psychological errors adaption
3. Types of test (Laboratory)

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4. Objective methods of evaluation – Density, volume, tenderness, tension, viscosity, weight, moisture loss, etc.

## Unit V

1. Importance of packaging
2. Various package forms – Products, tubes, tetrapacks, cans, bottles.
3. Packaging materials
4. Packaging methods and performances
5. Evaluation of packaging

## References

1. Food Science & Quality Control, S. Shrivastava
2. Preservation of fruits & vegetables, Girdhari Lal, Siddappa and G.L. Tondon
3. Food Preservation, Sundar Lal Sharma
4. Food Processing & Preservation, G. Subbulakshmi, Shobha A. Udipi
5. Food: Facts & Principles, N. Shakuntla, M. Sadakrishnaswami
6. Packaging Management, Briston & Neil, Gower Press
7. Food & Packaging Interactions, Hotchickess, American Chemical Society

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Department of Chemistry  
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PAPER-II  
POST HARVEST TECHNOLOGY  
&  
ANALYTICAL INSTRUMENTATION



### Unit I

1. Principles of food processing (a) Physical & (b) Chemical
2. Processing technology of cereals, legumes, oil seeds, fruits, vegetables, milk & milk products, meat, fish & poultry
3. Enrichment & fortification of food

### Unit II

1. Sprouting & fermentation
2. Additives
3. Preservatives
4. Quality Control in food industry, methods of evaluation & control of various aspects of quality of raw material, manufacturing process, the testing of finished products

### Unit III

1. Basics of instrumentation – Physical, chemical principles and methodology
2. Colorimetry, photometry

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## Unit IV

1. Chromatography – principles & techniques (thin layer, gas, liquid & high performance liquid chromatography)
2. Electrophoresis – Principle & applications, paper, moving boundary (agar & beta carotene).

## Unit V

1. Principles & applications of different techniques used in food & nutrition research
2. Spectrophotometry – phosphorus, ascorbic acid
3. Fluorimetry – Thiamin, Riboflavin
4. Radioactive trace techniques

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*Dr*      *Arif*      *Arif*      *Arif*

*R. Singh*  
*Sheetal Singh*

Department of Chemistry  
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Add-On Course - Food Science and Quality Control  
Eligibility for B.Sc. students along with B.Sc. Part – II



Laboratory Course

Details of Practical/Experiments/Field Work/Training/Sessionals Total Marks 50

1. Visit to food preservation centre
2. Preparation of jam, jelly, marmalades
3. Preparation of sherbet, squash and cordials
4. Preparation of sauce and ketchups
5. Preparation by dehydration methods of chips, papad, badi
6. Sensory testing of food – visual perception, colour, odour, smell, flavor, texture & taste
7. Survey of recent marketed packaging materials
8. Quality testing of packaging materials

*Dr. [Signature]* *Dr. [Signature]* *Dr. [Signature]* *Dr. [Signature]* *Dr. [Signature]* *Dr. [Signature]* *Dr. [Signature]*  
*24/07/19* *Sheetal P. S. Yk* *Dr. [Signature]* *Dr. [Signature]*



**DEPARTMENT OF CHEMISTRY**  
**GOVT. DIGVIJAY PG AUTONOMOUS COLLEGE RAJNANDGAON**



**Food Science and Quality Control**

**Vocational / Add-on Course**

**Syllabus for B.Sc. Part-III**

Theory Paper	Title of Paper	Duration	Max. Marks	Min. Marks
Paper-I	Food Analysis and Food Toxicology	3hr	75	25
Paper-II	Food Manufacturing and Testing	3hr	75	25
Practical		4hr	50	17

Approved by Board of Study for 2018-19

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Department of Chemistry  
Govt. Digvijay PG Autonomous College Rajnandgaon  
Add-On Course - Food Science and Quality Control  
Eligibility for B.Sc. students along with B.Sc. Part – III



Paper – I  
**FOOD ANALYSIS AND FOOD TOXICOLOGY**

**Objectives:** To be enable students –

1. To develop new food products which are marketable & nutritionally and economically viable.
2. To develop entrepreneurial abilities for small- scale food industries.

**UNIT-I**

1. Food composition & Factors affecting : carbohydrates, proteins, fats & oil, and naturals emulsifiers, organic acids, oxidants, antioxidants, enzymes, pigment and colours. flavours, vitamins, & minerals, natural toxicants water.
2. Sampling techniques : preparation of sample physical methods – lactometry, refractometry, polarimetry, viscosity, surface tension.

**UNIT – II**

1. General chemical methods of analysis
  - a. Total carbohydrate- mono, disaccharides, starch and gum, crude = fiber and dietary fibre.
  - b. Total fat and different types of lipids.
  - c. Total protein – (micro Kjeldahl methods, biuret methods, lawry,s methods) non protein and specific protein.
  - d. Macro & micro nutrients – Na, K, P, Ca, Mg, Fe, Zn, Vitamins.

**UNIT -III**

1. Toxicology – introduction, importance and scope.
2. (i) food contamination
  - (ii) Naturally occurring toxins in various foods.  
Substance – animal & plant foods.
  - (iii) substances intentionally added to food – antioxidants colours, stabilizers
3. Residual chemicals utilized in food production & processing.
  - (i) Chemical preservatives.

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- (ii) Pesticides
- (iii) Heavy metals.
- (iv) Hormones in foods.

#### UNIT – IV

Food borne illness – microbial & parasitic food poisoning

- (i) Bacterial intoxication – Staphylococcal botulism
- (ii) Bacterial infections – Salmonellosis, clostridium, E coli infection
- (iii) Non- Bacterial- Mycotoxins.
- (iv) Parasites - trichinosis, Amoebic dysentery Tapeworm.

#### UNIT - V

1. Introduction :-
  - (a) Application of irradiation in food preservation
  - (b) Effects of irradiation
2. Heat Treatments –
  - (a) Changes during thermal processing and effects on food quality and nutrients.
3. Carcinogens
  - (i) Definition and classification
  - (ii) Dietary factors.
4. Genetically Engineered foods :
  - Definition, Application of gene technology safety.

#### REFERENCE :

1. Principles & techniques of practical biochemistry Williams and K. Wiston. Edward Arnold pub.
2. Trace Analysis and Technological Development Ed. M.S. Das.
3. Microbiological Assay- an introduction to Quantitative principles & Evaluation. Bowitt W Academic Press 1977
3. Nutritional and toxicological Aspects of food processing ed. Walker and E. Quattrucci Taylor & Francis New York 1980.
4. Manual of Food Quality Control Addition Contaminants Techniques 1980.
5. The Chemical Analysis of food & food products By Morris B. Jacobs, 3<sup>rd</sup> Ed. Roberte Kriger.
6. Toxicological Aspects of food Ed. K. Lava miller E. Isevier Applied Science London & New York.

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**Department of Chemistry**  
**Govt. Digvijay PG Autonomous College Rajnandgaon**  
Add-On Course - Food Science and Quality Control  
Eligibility for B.Sc. students along with B.Sc. Part – III  
**Paper-II**



**FOOD MANUFACTURING ADULTERATION AND TESTING**

**Unit-I**

**MM:50**

1. Market Research → Concept of market , type of market , Scope of market research , importance of market research , production of market research.
2. Consumer Research → Consumer – meaning and definition consumer responsibility , consumer products , consumer behavior , importance of consumer research.
3. Food consumption pattern and the various factors affecting this pattern-  
economical , social , psychological and physiological.

**UNIT-II**

4. Trends in social change and its role in diet pattern . Food situation in india and outside.
5. Tapping the un-conventional post harvest losses.
6. Prospects of food processing for export . Traditional food status and need for revival in the context of westernized untraditional foods.
7. Product developing → primary and secondary processing , types of food products eg- quick cooking , fast food , convenience food.

**Unit-III**

8. Food laws → states and Municipal laws , voluntary , Mandatory , National and international , Role of voluntary agencies and legal aspects of consumer protection. Food Standard → Indian and international.

**Unit-IV**

9. Food Adulteration → Composition and quality criteria for the following – milk & milk products , flesh foods Food grains flours , fruit & vegetable products , Oil & fats , Spices & condiments , Beverages-alcoholic & non alcoholic canned foods.

**Unit-V**

1. Entrepreneurship , plant , location , investment
2. Food laws , equipment and space

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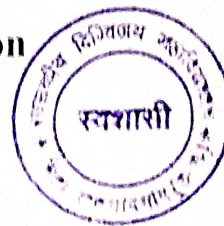
3. Costing of product
4. Advertising and marketing.
5. Large scale preparation of consumer products
6. Transporting -types/mode.

**REFERENCE:**

1. Ritson , C.Gofton L.me Kenzie J.The Food Consumer John Willey & Sons- New York ,1986
2. Association of food scientists & food technologist's proceeding of second international food science- foodscience & technological & Food convention (Indian Trends in food science & technology) IFCON—88 & 18-12-1988(FTR) Mysore.
3. Bender , Pe, Kromer , A.Kahan ,G Systems Analysis for food Industry AVI ,pul Co , Connecticut 1976.
4. Prevention of food adulterntion Act 1988
5. ISI publication
6. Pearsond Chemical analysis of Food-Egan kiv and sawyer.
7. Methods in food analysis –Jacob.
8. Handbook of analysis and quality control for fruits & vegetable products
9. Chemical methods of food analysis – Jacob.
10. Standard Methods for examination of dairy products – E.M. Master.

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**Department of Chemistry**  
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Add-On Course - Food Science and Quality Control  
Eligibility for B.Sc. students along with B.Sc. Part – III



**LABORATORY COURSE**

MM:50

**Analysis of Food and Testing of Adulteration in Food**

1. Analysis of food through simple Physical & Chemical Test.
  - (a) To analyse protins, mineral and vitamins by colorimeter.
  - (b) To analyse proteins by electrophoresis.
  - (c) To analyse facts and vitamins by paper and thin layer chromatography.
  - (d) To analyse facts gravimetrically.
  - (e) To analyse facts by volumetric methods.
  
2. Testing food Adulteration:-
  - (a) Milk and Milk products.
  - (b) Oil & Fats
  - (c) Canned foods
  - (d) Fruits & vegetable products.
  - (e) Spices and condiments.
  - (f) Flours.
  
3. Student will be taken to different types of food manufacturing units and food service establishments.
  
4. Project report to be submitted.

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