



TARA DEVI HARAKH CHAND KANKARIA JAIN COLLEGE

Affiliated to University of Calcutta & Accredited by NAAC (2016)
[Recognized under section 2(f) of UGC Act 1956]

(A self-financed Govt. approved Minority Institution run under the auspices of Shree S.S. Jain Sabha)

6, RAM GOPAL GHOSH ROAD, COSSIPORE, KOLKATA – 700 002
TEL.: 033 25326056 Mob: 9831378911/9831368911

1.3.2. Average percentage of courses that include experiential learning through project work/field work/internship during last five years (10)

| Sr. No. | Program name | Name of the Course that include experiential learning through project work/field work/internship | Course code | Number of students studying the courses that include experiential learning through project work/field work/internship | Actual number of students (without repeat of same student) |
|---------|-----------------------------------|--------------------------------------------------------------------------------------------------|-------------------|-----------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------|
| 1 | B.Sc. (Hons.) in Botany | Reproductive Biology of Angiosperm | BOT-A-CC3-6-P | 5* | 5 |
| 2 | | Plant Systematics | BOT-A-CC3-7-P | 5* | |
| 3 | | Economic Botany | BOT-A-CC4-9-P | 5* | |
| 4 | B.Sc. (Hons.) in Computer Science | Project Work | CMS-A-CC-6-14-P | 12 | 12 |
| 5 | B.Sc. (Hons.) in Geography | Research methodology and Field work Lab | GEO-A-CC-5-11-P | 18* | 18 |
| 6 | | Hazard Management | GEO-A-CC-6-14P | 18* | |
| 7 | B.Sc. (Hons.) in Zoology | Animal behavior and Chronobiology Lab. Topic: Study of Circadian Rhythms in humans | ZOOA-DSE(B)-6-1-P | 15* | 15 |
| 8 | | Animal Cloning and Application and Its Ethical issues | ZOOA-DSE(A)-6-2-P | 15* | |
| 9 | | Animal behavior and Chronobiology Lab | ZOOA-DSE(B)-6-1-P | 15* | |
| 10 | | Visit To National Park | ZOOA-CC5-11-P | 15* | |
| 11 | | Research Project (Sem 6) | BBAA604DSE1/2/3 | 56 | 56 |



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| | | | | | |
|----|-----------------------------------------|------------------------------------|------------------|-----|-----|
| 12 | BBA (Hons.) | Internship (Sem 4) | BBAA405SE2 | 20 | 20 |
| 13 | | Internship (Sem 2/4/6)-CCF 2022 | BBAA606SI | 40 | 40 |
| 14 | B.Sc. (Hons.) in Microbiology | Industrial Microbiology | MCB-A-CC-5-12-TH | 49 | 49 |
| 15 | B.Sc. (Hons.) in Food & Nutrition | Internship on Diet Counselling | FNTA-DSEA3 | 18 | 18 |
| 16 | B. Com | Internship (Sem 2) | --- | 144 | 144 |
| 17 | (Hons.) | Project Work | CC6.1 Ch | 544 | 544 |

* Same students did multiple Project/field work (counted once).

Total =

921



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Screen shots of Courses (from the curriculum) that include experiential learning through project work/field work/internship:

➤ Department of Botany:

1. BOT-A-CC3-6-P

EMBRYOLOGY

1. Pre-fertilisation changes :

- 1.1. Microsporogenesis and Microgametogenesis, 1.2. Megasporogenesis and Megagametogenesis (monosporic, bisporic and tetrasporic).

.....6 lectures

2. Fertilisation:

- 2.1. Pollen germination, 2.2. Pollen tube- growth, entry into ovule and discharge, 2.3. Double fertilization.

.....6 lectures

3. Post-fertilization changes :

- 3.1. Embryogenesis in Capsella, 3.2. Development of Endosperm (3 types).

.....10 lectures

4. Apomixis & Polyembryony:

- 4.1. Apomixis- Apospory and Apogamy, 4.2. Polyembryony- different types.

.....8 lectures

PRACTICAL- REPRODUCTIVE BIOLOGY OF ANGIOSPERMS (BOT-A-CC-3-6-P) (Credits 2)

1. Identification with reasons (Morphology)
2. Classroom performance: (Lab records)
3. Field Records (Field note book/ project work)
4. Viva

REPRODUCTIVE BIOLOGY OF ANGIOSPERMS

1. Inflorescence types- study from fresh/ preserved specimens
2. Flowers- study of different types from fresh/ preserved specimens
3. Fruits- study from different types from fresh/preserved specimens
4. Study of ovules (permanent slides/ specimens/photographs)- types (anatropous, orthotropous, amphitropous and campylotropous)
5. Field study desirable
6. A project supported along with photographs taken during field study to be submitted giving comprehensive idea about different types of inflorescence, flowers and fruits.

CLASSROOM PERFORMANCE

Same as above.



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2. BOT-A-CC3-7-P

PRACTICAL- PLANT SYSTEMATICS (BOT-A-CC-3-7-P) (Credits 2)

1. Workout on Angiosperms
2. Spot Identification
3. Classroom performance: (Lab records)
4. Field Records (Field note book, Herbarium specimens)
5. Viva

ANGIOSPERMS

1. Work out, description, preparation of floral formula and floral diagram, identification up to genus with the help of suitable literature of wild plants and systematic position according to Bentham Hooker system of classification from the following families: Malvaceae, Fabaceae (Papilionaceae), Solanaceae, Scrophulariaceae, Acanthaceae, Labiatae (Lamiaceae), Rubiaceae.
2. Spot identification (Binomial, Family) of common wild plants from families included in the theoretical syllabus (list to be provided).

FIELD WORK

At least three excursions including one excursion to Acharya Jagadish Chandra Bose Indian Botanic Garden (Shibpur, Howrah) and Central National Herbarium (CNH).

FIELD RECORDS

1. Field Note Book (authenticated) with field notes on the plants of the area of excursion and



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3. BOT-A-CC4-9-P

3. PRACTICAL- ECONOMIC BOTANY (BOT-A-CC-4-9-P) (Credits 2)

1. Workout, micro-chemical tests
2. Identification- T.S./L.S. of permanent slides
3. Classroom performance: (Lab records, permanent slides)
4. Field visit desirable to give an idea about cultivation of any crop (viz. rice, jute, mustard, tea, potato)
5. Field record of the visit, properly authenticated by escorting teacher

ECONOMIC BOTANY

1. Cereals: Wheat (habit sketch, L.S./T.S. of grain, starch grains, micro-chemical tests); rice (habit sketch, study of paddy and grain, starch grains, micro-chemical tests)
2. Legume: Soybean, ground nut (habit, fruit, seed structure, micro-chemical tests)
3. Source of sugars and starches: Sugarcane (habit sketch; cane juice- micro-chemical tests); potato (habit sketch, tuber morphology, T.S. of tuber to show localization of starch grains, W.M. of starch grains, micro-chemical tests).
4. Tea- tea leaves, tests for tannin
5. Mustard- plant specimen, seeds, tests for fat in crushed seeds
6. Habit sketch of *Digitalis*, *Papaver* and *Cannabis*.
7. Sal, Teak- section of young stem.
8. Jute- specimen, transverse section of stem, tests for lignin on T.S. of stem and study of fibre following maceration technique.

➤ Department of Computer Science:

4. CMS-A-CC-6-14-P -Project Work:

| Semester - VI | | | | |
|-----------------|-----------|------------------|-----------------------|--------|
| Course | Type | Course Code | Course Name | Credit |
| Core Course -13 | Theory | CMS-A-CC-6-13-TH | Software Engineering | 4 |
| Core Course -14 | Theory | CMS-A-CC-6-14-TH | Theory of Computation | 4 |
| | Practical | CMS-A-CC-6-14-P | Project | 4 |

CMS-A-CC-6-14-P: Project Work
Core Course-14, Practical, Credit:04, Contact hours: 60.
Candidates have to do their project in any relevant topic, under the supervision of teachers.



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➤ Department of Geography:

5. GEO-A-CC-5-11-P – Research Methodology

2.22 GEO-A-CC-5-11-P – Research Methodology and Fieldwork Lab ✧ 30 Marks / 2 Credits

Every student needs to participate in fieldwork and prepare a field report according to the following guideline, failing which he/she will not be evaluated for GEO-A-CC-5-11-P.

1. Each student will prepare a report based on primary data collected from field survey and secondary data collected from different sources.
2. Students will select either one rural area (*mouza*) or an urban area (municipal ward) for the study, with the primary objective of evaluating the relation between physical and cultural landscape.
3. A specific problem or a special feature should be identified based on which, the study area will be selected.
4. The report should be handwritten in English on A4 size paper in candidate's own words within 5,000 words (Introductory Chapter: 1000 words; Physical Aspects: 1500 words; Socio-economic Aspects: 1500 words; Concluding Chapter: 500 words, approximately) excluding tables, photographs, maps, diagrams, references and appendices.
5. Photographs, maps and diagrams should not exceed 15 pages.
6. A copy of the bound report, duly signed by the concerned teacher, will be submitted during examination.
7. The field work and post-field work will include:
 - a. Collection of primary data on physical aspects (relief and soil) of the study area. Students should use survey instruments like prismatic compass, dumpy level, Abney level or clinometer wherever necessary.
 - b. Collection of soil samples from different land cover land use regions of the study area for determining pH and NPK values with help of a soil kit.
 - c. Collection of socio economic data, at the household level (with the help of a questionnaire) in the selected study area.
 - d. Plot to plot land use survey for preparation of a land use map, covering whole or part of the selected area.
 - e. Visit to different organisations and departments for collection of secondary data.
 - f. Any other survey relevant to the objective of the study.
8. The Field Report should contain the following sections (a-e).
 - a. Introduction: Study area extent and space relations, reasons for selection of the study area on the basis of a specific problem or special feature, objectives, methods of data collection, analyses and presentation, sources of information, etc.
 - b. Physical aspects: Lithology and geological structure, relief, slope, drainage, climate, soil, vegetation, environmental issues, proneness to natural hazards, etc.
 - c. Socio-economic aspects:
 - i. Population attributes: Number, sex ratio, literacy, occupational structure, ethnic and religious composition, language, per capita income, etc.
 - ii. Settlement characteristics: Number of houses, building materials, number and size of rooms, amenities, etc.
 - iii. Agriculture: General land use, crop-combination, use of fertiliser and irrigational facilities, production and marketing etc.
 - iv. Other economic activities: Fishing, horticulture, brick-making, household and other industries, etc.



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6. GEO-A-CC-6-14-P-Hazard Management

2.28 GEO-A-CC-6-14-P – Hazard Management Lab ✧ 30 Marks / 2 Credits

A Group Project Report is to be prepared and submitted based on any one case study among the following hazards from West Bengal, incorporating a preparedness plan, preferably in the vicinity of the candidates' institution / district:

1. Earthquake
2. Landslide
3. Land subsidence
4. Thunderstorm
5. Flood
6. Riverbank / Coastal erosion
7. Fire
8. Industrial accident
9. Road / Railway accident
10. Structural collapse
11. Environmental pollution
12. Biohazard

One case study will be done by a group of five to ten students. Different groups may choose different case studies from any one or different types of disasters. The report should be prepared on secondary data and handwritten on A4 page in candidates' own words not exceeding 2,000 words excluding references. The report should contain a proper title. The report should incorporate relevant tables, maps, diagrams, and references, not exceeding ten pages. Photographs are optional and should not exceed three. A copy of the stapled / spiral-bound report in a transparent cover, duly signed by the concerned teacher, is to be submitted during examination. Without the report the candidates will not be evaluated for GEO-A-CC-6-14-P.

Marks division: 20 on report + 10 on viva-voce = 30



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➤ Department of Zoology:

7. ZOO-A-DSEB-6-1-P – Animal Behavior and Circadian Rhythm

Animal Behaviour and Chronobiology Lab, ZOOA-DSE(B)-6-1-P

| Full Marks 50 | 60 Hours | 2 Credits |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|-----------|
| List of Practical | | |
| <ol style="list-style-type: none">1. To study nests and nesting habits of the birds and social insects.2. To study the behavioural responses of wood lice to dry and humid conditions(demonstration only).3. To study geotaxis behaviour in earthworm.4. To study the phototaxis behaviour in insect larvae.5. Visit to Forest/ Wild life Sanctuary/Biodiversity Park/Zoological Park to study behavioural activities of animals and prepare a short report.6. Study of circadian functions in humans (daily eating, sleep and temperature patterns). | | |

8. ZOO-A-DSEA-6-2-P – Animal Cloning

Animal Biotechnology Lab, ZOOA-DSE(A)-6-2-P

| Full Marks 30 | 60 Hours | 2 Credits |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|-----------|
| List of Practical | | |
| <ol style="list-style-type: none">1. Genomic DNA isolation from <i>E. coli</i> and Plasmid DNA isolation (pUC 18/19) from <i>E. coli</i>2. To study following techniques through photographs - Southern Blotting, Northern Blotting, Western Blotting, PCR, DNA fingerprinting <p>✓ Project report on animal cloning & Application & ethical Issues.</p> | | |



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9. ZOOA-DSE(B)-6-1-P- Visit to Bandhavgarh, Madhya Pradesh

Animal Behaviour and Chronobiology Lab, ZOOA-DSE(B)-6-1-P

| Full Marks 50 | 60 Hours | 2 Credits |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|-----------|
| List of Practical | | |
| <ol style="list-style-type: none">1. To study nests and nesting habits of the birds and social insects.2. To study the behavioural responses of wood lice to dry and humid conditions(demonstration only).3. To study geotaxis behaviour in earthworm.4. To study the phototaxis behaviour in insect larvae.5. Visit to Forest/ Wild life Sanctuary/Biodiversity Park/Zoological Park to study behavioural activities of animals and prepare a short report.6. Study of circadian functions in humans (daily eating, sleep and temperature patterns). | | |

10. ZOOA-CC6-11-P (visit to National Park- Bandhavgarh, Madhya Pradesh)

| | |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|
| Unit 4: Ecosystem | 1 |
| Types of ecosystem with an example in detail, Food chain: Detritus and grazing food chains, Linear and Y-shaped food chains, Food web, Energy flow, Ecological pyramids and Ecological efficiencies, Nitrogen cycle. | |
| Unit 5: Applied Ecology | 7 |
| Types & level of biodiversity Mega-diversity countries, Biodiversity Hot spot, Flagship species, Keystone species, Wildlife Conservation (in situ and ex situ conservation), concept of protected areas, Red data book, Indian wild life act & Schedule. Concept of corridor, advantages and problem of corridor. Threats to survival and conservation strategies for Tiger, Olive ridley, White Rumped Vulture. | |

Ecology Lab, ZOOA-CC5-11-P

| Full Marks 30 | 60 Hours | 2 Credits |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|-----------|
| List of Practical | | |
| <ol style="list-style-type: none">1. Determination of population density in a natural/hypothetical community by quadrat method and calculation of Shannon-Weiner diversity index for the same community2. Study of an aquatic ecosystem: Phytoplankton and zooplankton, Measurement of area, temperature, salinity, determination of pH, and Dissolved Oxygen content (Winkler's method), Chemical Oxygen Demand and free CO₂3. Report on a visit to National Park/Biodiversity Park/Wild life sanctuary/ any place of ecological interest/ ecological uniqueness/ Zoological garden | | |



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➤ Department of Business Administration:

11. BBA-BBAA604DSE4C-Research project

| Semester V | | | | | |
|-------------|----------------------------------------------------------------|------|------------------------------------------------|-----|--------------------------|
| | Quantitative Techniques for Management | 100 | Core | 6 | BBAA501C11 |
| | Legal Aspects of Business | 100 | Core | 6 | BBAA502C12 |
| | Elective – I Discipline Specific Elective-paper a of 1/2/3/4 | 100 | Disc. Specific Elective | 6 | BBAA503DSE 1/2/3/4(A) |
| | Elective – II Discipline Specific Elective-paper b of 1/2/3/4 | 100 | Disc. Specific Elective | 6 | BBAA504DSE 1/2/3/4(B) |
| | | 400 | | 24 | |
| Semester VI | | | | | |
| | Business Policy & Strategy | 100 | Core | 6 | BBAA601C13 |
| | Financial Institutions and Markets | 100 | Core | 6 | BBAA602C14 |
| | Elective – III Discipline Specific Elective-paper c of 1/2/3/4 | 100 | Disc. Specific Elective | 6 | BBAA603DSE 1/2/3/4(C) |
| | Research Project | 100 | Disc. Specific Elective (Applicable to all) | 6 | BBAA604DSE 1/2/3/4 |
| | | 400 | | 24 | |
| TOTAL | | 2600 | | 144 | |

12. BBAA405SE2 (Internship-Sem 4)

Business to Business e-commerce: Meaning, benefits and opportunities in B2B, B2B building blocks and their relationship to supply chain management, key B2B models and their main functions, EDI as a B2B tool.

Consumer oriented e-commerce: traditional retailing and e-retailing, benefits and key success factors for e-retailing, models for e-retailing like specialized and generalized e-stores, e-mall, direct selling by manufacturer, supplementary distribution channel, e-broker and e-services like web-enabling services, matchmaking services, information selling on the web, entertainment services and auction services.

E-core values: ethical issues, legal issues, taxation issues and international issues.

BBAA405SE2 Summer Internship(Credits -4, Marks-100)

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13.BBAA606SI (Internship -2/4/6-CCF2022)

| Semester 6 | | | | | |
|------------|---------------------------|-----|------|---|-------------|
| 1 | Legal Aspects of Business | 100 | Core | 4 | BBAA601CC13 |
| 2 | Management Accounting | 100 | Core | 4 | BBAA602CC14 |

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| 3 | Tax Planning | 100 | Core | 4 | BBAA603CC15 |
|------------|--------------------------------------------------------------|-----|-------|----|-------------|
| 4 | Human Rights and Practices | 100 | Minor | 4 | BBAA604M7 |
| 5 | Ecommerce and Case Study | 100 | Minor | 4 | BBAA605M8 |
| 6. | Summer Internship*(Internal and external from colleges only) | 75 | | 3 | BBAA606SI |
| | | 575 | | 23 | |
| Semester 7 | | | | | |
| 1 | International Trade Policy and Strategy | 100 | Core | 4 | BBAA701CC16 |
| 2 | Corporate Social | 100 | Core | 4 | BBAA702CC17 |



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➤ Department of Microbiology

14. MCB-A-CC-5-12-TH (Industrial Microbiology)

B.Sc (HONOURS) MICROBIOLOGY (CBCS STRUCTURE) C-12: INDUSTRIAL MICROBIOLOGY (THEORY) SEMESTER –V

TOTAL HOURS: 60

CREDITS: 4

Unit 1 Introduction to industrial microbiology

Brief history and developments in industrial microbiology

No. of Hours: 2

Unit 2 Isolation of industrially important microbial strains and fermentation media

No. of Hours: 10

Sources of industrially important microbes and methods for their isolation, preservation and maintenance of industrial strains, strain improvement, Crude and synthetic media, molasses, corn-steep liquor, sulphite waste liquor, whey, yeast extract and protein hydrolysates

Unit 3 Types of fermentation processes, bio-reactors and measurement of fermentation parameters

No. of Hours: 12 Types of fermentation processes - Solid-state and liquid-state (stationary and submerged) fermentations; batch, fed-batch (eg. baker's yeast) and continuous fermentations
Components of a typical bio-reactor, Types of bioreactors-Laboratory, pilot- scale and production fermenters, constantly stirred tank and air-lift fermenters, Measurement and control of fermentation parameters - pH, temperature, dissolved oxygen, foaming and aeration

Unit 4 Down-stream processing

No. of Hours: 6

Cell disruption, filtration, centrifugation, solvent extraction, precipitation, lyophilization and spray drying

Unit 5 Microbial production of industrial products (micro-organisms involved, media, fermentation conditions, downstream processing and uses)

No. of Hours: 18 Citric acid, ethanol, penicillin, glutamic acid, Vitamin B12 Enzymes (amylase, protease, lipase)

Unit 6 Enzyme immobilization

No. of Hours: 4

Methods of immobilization, advantages and applications of immobilization, large scale applications of immobilized enzymes (glucose isomerase and penicillin acylase)

C-12: INDUSTRIAL MICROBIOLOGY (PRACTICAL) SEMESTER –V

TOTAL HOURS: 60

CREDITS: 2

1. Study different parts of fermenter
2. Microbial fermentations for the production and estimation (qualitative and quantitative) of:
 - (a) Enzymes: Amylase and Protease
 - (b) Amino acid: Glutamic acid
 - (c) Organic acid: Citric acid
 - (d) Alcohol: Ethanol

3. A visit to any educational institute/industry to see an industrial fermenter, and other downstream processing operations.



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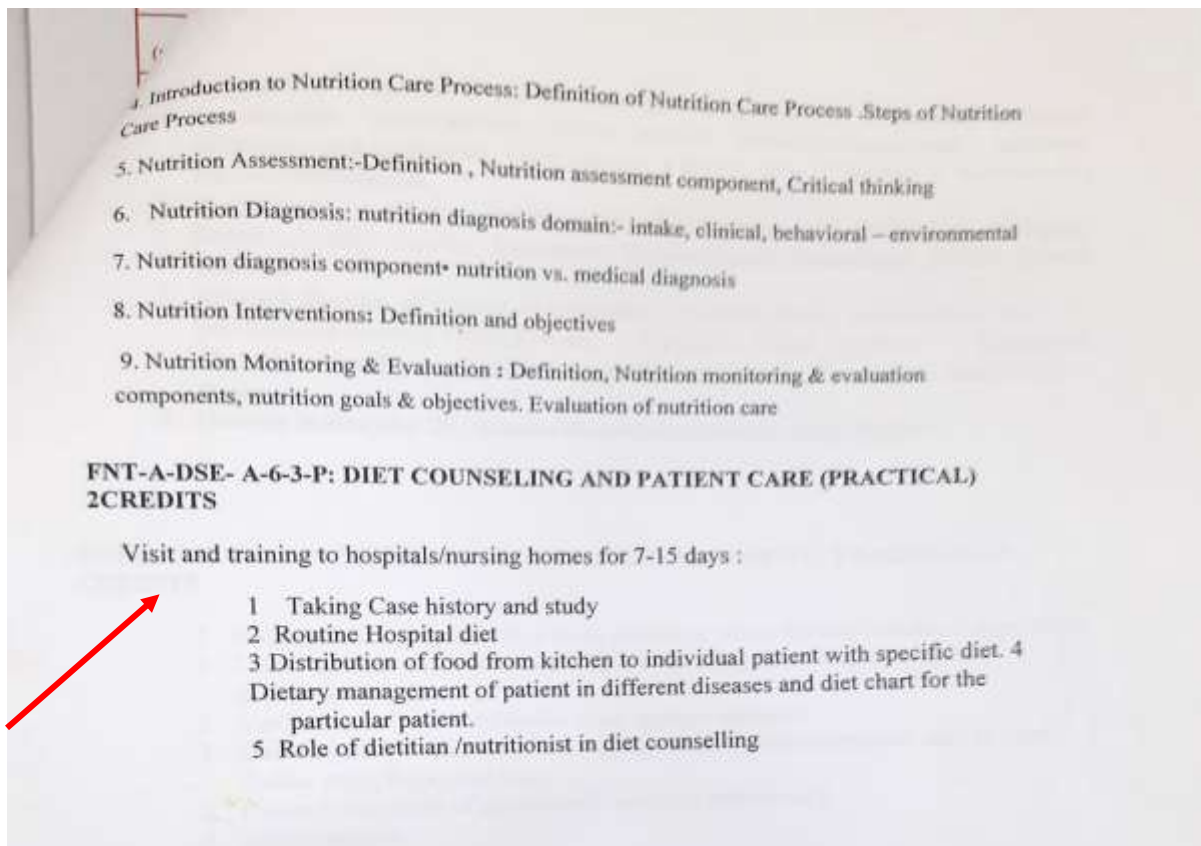
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➤ Department of Food & Nutrition

15. FNTA-DSEA3 (Internship on Diet Counselling)





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➤ **Department of Commerce:**

16. Internship (Sem 2/4/6-CCF2022)

17. CC6.1 Ch (B. Com Hons.)-Project Work

Year 3: Semester VI

| | | Marks | Credit Hours | |
|-------------|------------------------------------------------------|--------------|---------------------|--|
| AECC 6.1Chg | Environmental Studies | 100 | 2 | |
| SEC 6.1Chg | Computerised Accounting and e-Filing of Tax Returns | 100 | 4 | |
| CC 6.1 Ch | Project Work | 100 | 6 | |
| DSE 6.1 A** | Financial Reporting and Financial Statement Analysis | 100 | 6 | |
| DSE 6.2 A** | Financial Management | 100 | 6 | |

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Chg: Common for Honours and General; **Ch:** Core Course for Honours