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Date: Tue, Jun 9, 2020 at 4:08 PM
Subject: Agenda Item- BoS in Zoology and BoS in Mathematics
To: Joint Registrar (Academic) <jointregacad@unigoa.ac.in>

Sir,

Attached herewith the Agenda Item pertaining to BOS in Zoology and BoS in Mathematics to be placed before the Academic Council Meeting to be held on 19 and 20 June 2020 for approval.

Thanks & Regards
Ashwin Lawande
Assistant Registrar
Academic-PG Depts.,
Goa University.
PH: 8669609021, 8669609065
www.unigoa.ac.in

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2 Attachments • Scanned by Gmail

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D.3 BOARD OF STUDIES

D.3.1

Proposed Part Amendment to Ordinance OC-21 relating to the Degree of Bachelor of Ayurvedic Medicine and Surgery, B. A. M. S Programme.

The Principal, Gomantak Ayurveda Mahavidyalaya and Research Centre, Shiroda has submitted part amendment to Ordinance OC-21 relating to the Degree of Bachelor of Ayurvedic Medicine and Surgery (B.A.M.S) programme based on the Official Gazette of India dated- 07/11/2016.
Three column format for part amendment to the Ordinance OC-21.8 is placed as Annexure I.
The Academic Council may kindly decide.

D.3.2 **Minutes of the meeting of the Dentistry approved by circulation by email May 18-02 2020**

PART – A

i. Recommendations regarding courses of study in the subject or group of subjects at the under-graduate level. **…. ……NIL**

ii. Recommendations regarding courses of study in the subject or group of subjects at the Post-graduate level ……**……. NIL**

iii. The minutes of the previous meeting of the Board of Studies held on 18/09/2019 were discussed and approved.

PART – B

i. **Scheme of examinations at the Under-graduate level**

The Existent and proposed distribution of marks and scheme of Theory Examination for the Final year B.D.S. Part-I Goa University exams in the subject of Oral Medicine & Radiology is as follows:

	MCQs	**Marks**	**Long Essay Questions**	**Marks**	**Short Notes**	**Marks**	**Total Marks**
Existent Distribution of Marks	14	10	02	30	10	30	70
Proposed Distribution of Marks	10	10	02	20	08	40	70

ii. Panel of examiners for different examinations at the Under-graduate level.
List of Internal Examiners for empanellment in the subject of Paedodontics and Preventive Dentistry has been scrutinized and updated and is herewith forwarded to the Goa University.

iii. Scheme of examinations at the Post-graduate level. - NIL

iv. Panel of Examiners for different examinations at the Post-graduate level. -NIL

PART – C

1. Recommendation regarding preparation and publications of selection of reading material in any subject or group of subjects and names of persons recommended for appointment to make the selection…... **NIL**

PART – D

1. Recommendations regarding general academic requirements in the Departments of University or affiliated Colleges.

PART – E

i. Recommendations of text books for the courses of study at the Under-graduate level. …… **NIL**

ii. Recommendations of text books for the courses of study at Post-Graduate level……. ……..**NIL**

PART – F

i) Important points for consideration/approval of Academic Council

a) The distribution of marks for Final BDS Part-I, Goa University Exams in the subject of Oral Medicine & Radiology needs revision.
The distribution of marks can be seen in Part B.
The total marks is 70 and does not change with the revised pattern of the Theory Paper.

-Sd/-
Dated : 18/02/2020 **Chairperson/Dean**
Place : G.D.C&H., **Goa Dental College & Hospital**
Bambolim, Goa**.**

PART-G

Remarks of the Dean, Faculty of Medicine

i) The minutes are in order
ii) The minutes may be placed before the Academic Council with remarks if any.
iii) May be recommended for approval of the Academic Council.
iv) Special remarks if any.

Dated : /02/2020 **Dr. Wiseman Pinto**
Place : Goa Dental College & Hospital **Signature of the Dean,**
Bambolim-Goa. **Faculty of Medicine**

D 3.3 **Minutes of the meeting of the Sub-Board of Studies in BBA(FS) approved by circulation by email May 13-21, 2020**

PART A

i. Recommendation regarding courses of study in the subject or group of subjects at the undergraduate level.

- ***The Standing Committee had approved the change in the structure of the BBA(FS) programme, wherein two summer internships have been replaced by a full-Semester internship at Semester VI. Accordingly, the courses at various lower semesters had to be changed.***
- **The proposed programme structure and syllabus of the courses is appended at Annexure 1.**

ii. Recommendation regarding courses of study in the subject or group of Subjects at the post-graduate level and undergraduate level.

Nil

PART B

(i) Scheme of examinations at the undergraduate level.

Nil

(ii) Panels of examiners for different examinations at the undergraduate level.

Nil

(iii) Scheme of examinations at the post-graduate level.

Nil

(iv) Panels of examiners for different examinations at the post-graduate level.

Nil

PART C

(i) Recommendation regarding preparation and publication of selection of reading material in any subject or group of subject and the names of person recommended for appointment to make the selection.

Nil

PART D

(i) Recommendation regarding general academic requirements in the departments of University of affiliated colleges.

Nil

PART E

(i) Recommendation of text books for the courses of study at the Undergraduate level

Nil

(ii) Recommendation of text books for the courses of study at the post-graduate level.

Nil

	PART F Important points for consideration/approval of Academic Council i) The important points/ recommendations of SBoS that require consideration/approval of the Academic Council **The proposed programme structure and syllabus of the BBA(FS) programme from the Academic Year 2020-21 may be approved** (ii) The declaration by the Chairperson, that the minutes were read out by the Chairperson at the meeting itself. Sd/- Date: 21/05/2020 Signature of the Chairperson Place: Margao **PART G** : The remarks of the Dean of faculty (i) The minutes are in order. (ii) The minutes may be placed before the Academic Council with remark, if any. (iii) May be recommended for approval of Academic Council. (iv) Special remarks if any Sd/- Date: Signature of the Dean Place:
D 3.4	**Minutes of the meeting of the Board of Studies in Economics held on 01 June 2020.**
	. PART A : i. Not on Agenda ii. Recommend elective courses, recommend Swayam courses as elective courses iii. Not on Agenda iv. Not on Agenda v. Not on Agenda vi. Not on Agenda vii. Not on Agenda viii. Not on Agenda PART B : i. Not on Agenda ii. Not on Agenda iii. Not on Agenda iv. Not on Agenda v. Not on Agenda vi. Not on Agenda

PART C :

i. Not on Agenda
ii. Not on Agenda

PART D :

i. Not on Agenda
ii. Not on Agenda

PART E :

i. Not on Agenda
ii. Not on Agenda
iii. Not on Agenda
iv. Not on Agenda

A.O.B-
Nil

PART F:

1. Important Points/recommendations of BOS that require consideration/approval of Academic Council
   (a) Approval of the following elective courses
      (i) The Indian Economy- 4 credits (Eco 130)
      (ii) Introduction to Spatial Economics- 4 credits (Eco 131)
      (iii) Game Theory-1 2 credits (Eco 132)
      (iv) Game Theory-II 2 credits (Eco 232)

   (b) Approval of the Swayam courses as elective courses at MA Economics

The foregoing minutes of the meeting were read out by the Chairperson at the meeting itself and they were unanimously approved by all the members present.

Sd/-
Date : 1stth June, 2020 (Professor P.K.Sudarsan)
Signature of the Chairperson

PART G : The remarks of the Dean of the Faculty :

a. The minutes are in order.
b. The minutes may be placed before the Academic Council with remark, if any.
c. Important points of the minutes which need clear policy decision of the Academic Council to be recorded.

Date : 01/06/2020

Sd/-
Prof. VenkateshKamat
Signature of the Dean
(Goa Business School)

D 3.5	**Minutes of the meeting of the Board of Studies in international Hospitality Management through Circulation.**

Part A.

i. Recommendations regarding courses of study in the subject or group of subjects at the undergraduate level: Nil

ii. Recommendations regarding courses of study in the subject or group of subjects at the postgraduate level: **MSc International Hospitality and Tourism Management (Annexure-I)**

Part B

i. Scheme of Examinations at undergraduate level: Nil

ii. Panel of examiners for different examinations at the undergraduate level: NONE

iii. Scheme of Examinations at postgraduate level: Nil

iv. Panel of examiners for different examinations at post-graduate level: NONE

Part C.

i. Recommendations regarding preparation and publication of selection of reading material in the subject or group of subjects and the names of the persons recommended for appointment to make the selection:**As per the syllabus Enclosed (Annexure-II)**

Part D

i. Recommendations regarding general academic requirements in the Departments of University or affiliated colleges:Nil

ii. Recommendations of the Academic Audit Committee and status thereof:Nil

Part E.

i. Recommendations of the text books for the course of study at undergraduatelevel: Nil

ii. Recommendations of the text books for the course of study at post graduate level: **As per the syllabus Enclosed (Annexure-II)**

Part F.

<u>Important points for consideration/approval of Academic Council</u>

i. The important points/recommendations of BoS that require consideration/approval of Academic Council (points to be highlighted) as **mentioned** below:
   a. Course Structure of MSc. International Hospitality and Tourism Management **(Annexure-I)**
   b. Detailed syllabus**(Annexure-II)**
   c. Part Amendments to Ordinance OA-18A, OA-20**(Annexure-III)**

Date:
Place: Sd/-
Signature of the Chairman

Part G. The Remarks of the Dean of the Faculty

i) The minutes are in order
ii) The minutes may be placed before the Academic Council with remarks if any.
iii)May be recommended for approval of Academic Council.
iv)Special remarks if any.

Date: Sd/-
Place Signature of the Dean

D 3.6	**Minutes of the meeting of the Board of Studies in Homoeopathy held on 03 June 2020.**

Part – A

i) Recommendations regarding courses of study in the subject or group of subjects at the undergraduate level. **:** ***NIL***

ii) Recommendations regarding courses of study in the subject or group of subjects at the postgraduate level. **:** ***N.A.***

Part – B

i) Scheme of examinations at undergraduate level. **:** ***NIL***

ii) Panel of examiners for different examinations at the under-graduate level. **:**

Annexure– I

iii) Scheme of examinations at post-graduate level. **:** ***N.A.***

iv) Panel of examiners for different examinations at the post-graduate level **:** ***N.A.***

Part – C

Recommendations regarding preparation and publication of selection of reading material in the subject or group of subjects and the names of the persons recommended for appointment to make the selection.

:*No recommendations*

Part – D

Recommendations regarding general academic requirements in the departments of University or affiliated colleges.

: ***No recommendations***

Part – E

i) Recommendations of text books for the course of study at under-graduate level **: *NIL***

ii) Recommendations of reference books for the course of study at undergraduate level **: *NIL***

iii) Recommendations of text books for the course of study at post-graduate level **: *N.A.***

Part – F

Important points for consideration/approval of Academic Council:

i) Eligibility for the Post of Lecturer or Assistant Professor with MSC – PG Medical Degree.

ii) Upper age limit 25 years for General Category and 30years for SC/ST/OBC and Physically Handicapped person.

iii) NEET clearance is compulsory for B.H.M.S. admission.

iv) 15% seats shall be for All India Quota.

PROF. (DR.) ROSHANI R. SHIRWAIKAR
Principal (Officiating), SKHMCH
CHAIRMAN
Board of Studies in Homoeopathy
Goa University

Date: 04.06.2020
Place: Goa University.

Part – G

The remarks of the Dean of the faculty:

i) The minutes are in order.
ii) The minutes may be placed before the Academic Council with remarks if any.
iii) May be recommended for approval of Academic council.
iv) Special remarks if any.
v)

Date: 04/06/2020
Place:

PROF. DR. WISEMAN PINTO
Prof. & HOD
Goa Medical College
DEAN
Faculty of Medicine
Goa University

D 3.7 **Minutes of the meeting of the Board of Studies in Zoology held on 05 June 2020 .**

Part A.

i. Recommendations regarding courses of study in the subject or group of subjects at the undergraduate level: -NA-

ii. Recommendations regarding courses of study in the subject or group of subjects at the postgraduate level:
BoS approved and recommend the frame work of the restructured PG syllabus from the academic year 2020-21. BoS also approved and recommend the syllabus of Core courses to be taught during the academic year 2020-21.
BoS identify some courses for credit mobility of some MOOCs through SWAYAM portal for the upcoming M.Sc. Part II students

Part B

i. Scheme of Examinations at undergraduate level: -NA-

ii. Panel of examiners for different examinations at the undergraduate level: -NA-

iii. Scheme of Examinations at postgraduate level: -NA-

iv. Panel of examiners for different examinations at post-graduate level:-NA-

Part C.

i. Recommendations regarding preparation and publication of selection of reading material in the subject or group of subjects and the names of the persons recommended for appointment to make the selection: -NA-

Part D

i. Recommendations regarding general academic requirements in the Departments of University or affiliated colleges: -NA-

ii. Recommendations of the Academic Audit Committee and status thereof:-NA-

Part E.

i. Recommendations of the text books for the course of study at undergraduate level: -NA-

ii. Recommendations of the text books for the course of study at post graduate level:

List of Reference is provided along with the syllabus-

Part F.

Important points for consideration/approval of Academic Council

i. The important points/recommendations of BOS that require consideration/approval of Academic Council (points to be highlighted) as mentioned below;

a) Frame work of the restructured PG Syllabus to be implemented from 2020-21. (Annexure Ia)

b) Detailed syllabus for core courses to be taught in the forthcoming academic year 2020-21. (Annexure Ib)

c) Identified courses for credit mobility for MOOCs through SWAYAM portal for upcoming M Sc Part II students. (Annexure II)

ii. The declaration by the chairman that the minutes were readout by the Chairman at the meeting itself (copy of the minutes is enclosed).

Date: 8-06-2020
Place: Goa University

Sd/-
Signature of the Chairman

Part G. The Remarks of the Dean of the Faculty

i) The minutes are in order
ii) The minutes may be placed before the Academic Council with remarks if any
iii) May be recommended for approval of Academic Council.
1. Special remarks if any.

Date:
Place

Sd/-
Signature of the Dean

D 3.8	**Minutes of the meeting of the Board of Studies in Mathematics held on 05 June 2020 by circulation.**

Part A

(I) Recommendations regarding courses of study in the subject or group of subjects at the undergraduate level:

There were some discrepancies in the marking of credits to two papers in BSc syllabus. In one place it was marked as 4 credit while some other place it was marked as 3+1 credits. This ambiguity was brought to our notice by some college teachers. We have not changed the main syllabus. Only credit allocation and the number of hours for Theory and Practical were changed.
The revised structure is placed at ANNEXTURE-I

(II) Recommendations regarding courses or group of subjects at postgraduate level:

BOS also discussed about SWAYAM Courses for PG program.
The list of Swayam courses is placed at ANNEXTURE-II

Part B :

(I) Scheme of the Examinations at Undergraduate Level: Nil

(II) Panel of examiners for different examinations at Undergraduate Level: Nil

(III) Scheme of the examinations at post-graduate level: **Nil**

(IV) Panel of examiners for different examinations at post-graduate Level: Nil

Part C

(I) Recommendations regarding preparation and publication and selection of Anthologies in any subject or group of subjects and the names of person recommended for appointment to make the selection: Nil

Part D

(I) Recommendations regarding general academic requirements in the Departments of University or affiliated colleges: Nil

II) Recommendation of Academic Audit committee and status thereof
No recommendations received so far by BoS Mathematics

Part E

(I) Recommendations of text books for the course for study at the Undergraduate level: Nil

(II) Recommendations of text books for the courses of study at the post Graduate level: Nil

Part F

Important points for consideration/approval of Academic Council:

SWAYAM courses for PG level and syllabus at UG level.

The declaration by the Chairman, that the minutes were read out by the Chairman at the meeting itself.

Sd/-
Signature of Chairman

Date: 5th June 2020
Place: Goa University

Part G: The remarks of the Dean of the Faculty.

(I) The minutes are in order.
(II) The minutes may be placed before the Academic Council with remarks if any.
(III) May be recommended for approval of Academic Council
(IV) Special remarks if any: Nil

Sd/-
Signature of the Dean

Date: 05-06-2020
Place: Goa University

Proposed Part Amendment to Ordinance OC-21 relating to the Degree of Bachelor of Ayurvedic Medicine and Surgery, B.A.M.S Course			
Ordinance No.	**Existing**	**Proposed**	**Justification**
OC-21.8.1	The first B.A.M.S. examination shall be held in the following subjects:- 1. PadarthVigyanevamAyurvedItihas 2. Sanskrit 3. KriyaSharir (Physiology) 4. RachanaSharir(Anatomy) 5. MaulikSiddhantevamashtangaHridaya (Sutra Sthan). FIRST B.A.M.S. EXAMINIATION: i)The first B.A.M.S. examination shall be held at the end of the academic year in the following subjects:- 1. PadarthVigyanevamAyurvedItihas 2. Sanskrit 3. KriyaSharir (Physiology) 4. RachanaSharir(Anatomy) 5. MaulikSiddhantevamashtangaHridaya (Sutra Sthan). The First B.A.M.S. examination shall be ordinarily held and completed by the end of the month of May/June every year after completion of one year of First B.A.M.S. session. ii) A student failing in not more than two subjects of first B.A.M.S. examination shall be eligible to keep terms for second B.A.M.S. However he/she will not be allowed to appear for the second B.A.M.S. examination unless he/she passes in all the subjects of the first B.A.M.S.	The failed student of first Professional shall be allowed to appear in second professional examination, but the student shall not be allowed to appear in third professional examination unless the student passes all the subjects of first professional examination and maximum four chances shall be given to pass first professional examination within a period of maximum three years.	As per Gazette of Govt. of India, Notification 7th Nov.2016

OC-21.8.2	Second B.A.M.S. Examination: i) The second B.A.M.S. examination shall be held at the end of the academic year in the following subjects:- 1. DravyagunaVigyan (pharmacology and MateriaMedica) 2. Rasashastra and BhaishajyaKalpana (Pharmaceutical Science) 3. RogNidanevamVikrutiVigyan (Diagnostic Procedure & Pathology) 4. CharakSamhita- Purvardh. The Second B.A.M.S. examination shall be ordinarily held and completed by the end of the month of May/ June every year after completion of one year of Second B.A.M.S. session. ii) A student failing in not more than two subjects of second B.A.M.S. examination shall be eligible to keep terms for the third B.A.M.S. examination unless he/she passes in all the subjects of second B.A.M.S. examination.	The failed student of second professional who have passed all the subjects of first professional examination shall be allowed to appear in third professional examination, but the student shall not be allowed to appear in final professional examination unless the student passes all the subjects of second professional examination and maximum four chances shall be given to pass second professional examination within a period of maximum three years.	As per Gazette of Govt. of India, Notification 7th Nov.2016
OC-21.8.3	Third B.A.M.S. Examination: i) The third B.A.M.S. examination shall be held at the end of the academic year in the following subjects:- 1) AgadtantraVyavharAyurvedevamVidhiVaidyaka (Toxicology and Medical Jurisprudence). 2) CharakSamhita-Uttarardh. 3) SwasthaVritta and Yoga (Preventive and Social Medicine and Yoga) 4) Prasutitantra and Striroga (Gynaecology and Obstetrics) 5) BalRoga (Peadiatrics) The Third B.A.M.S. examination shall be ordinarily held and completed by the end of the month of May/ June every year after completion of one year of third B.A.M.S.		

		session. ii) A student failing in not more than two subjects shall be held eligible to keep the terms for the final professional examination, however he/she will not be allowed to appear for final professional examination unless he/she passes in all the subjects of Third B.A.M.S. examination. Third B.A.M.S. Examination: i) The third B.A.M.S. examination shall be held at the end of the academic year in the following subjects:- 1) AgadtantraVyavharAyurvedevamVidhiVaidyaka (Toxicology and Medical Jurisprudence). 2) CharakSamhita-Uttarardh. 3) SwasthaVritta and Yoga (Preventive and Social Medicine and Yoga) 4) Prasutitantra and Striroga (Gynaecology and Obstetrics) 5) BalRoga (Peadiatrics) The Third B.A.M.S. examination shall be ordinarily held and completed by the end of the month of May/ June every year after completion of one year of third B.A.M.S. session. ii) A student failing in not more than two subjects shall be held eligible to keep the terms for the final professional examination, however he/she will not be allowed to appear for final professional examination unless he/she passes in all the subjects of Third B.A.M.S. examination. Final B.A.M.S. Examination:- i) The final	The failed student of third professional who have passed all the subjects of first and second professional examinations shall be allowed to appear in final	As per Gazette of Govt. of India, Notification 7th Nov.2016

OC-21.8.3(A)		B.A.M.S session shall be of 18 months duration and start every year, in the month following completion of the Third B.A.M.S Examination. ii) Final B.A.M.S examination shall comprise of the following subjects:- 1. ShalyaTantra (General Surgery) 2. ShalakyaTantra (Diseases of Head and Neck including Ophthalmology, ENT and Dentistry) 3. Kayachikitsa (Internal Medicine including ManasRoga, Rasayan and Vajikarana) 4. Panchakarma 5. Research Methodology and Medical-statistics. The final B.A.M.S examination shall be ordinarily held and completed by the end of October/November every year, after completion of 18 months of final B.A.M.S.	professional examination and maximum four chances shall be given to pass third professional examination within a period of maximum three years. The student failed in any of the four professional examinations in four chances shall not be allowed to continue his or her studies: Provided that, in case of serious personal illness of a student and in any unavoidable circumstances, the ViceChancellor of the concerned University may provide one more chance in any one of four professional examinations; To become eligible for joining the compulsory internship programme, all four professional examinations shall be passed within a period of maximum nine years including all chances as mentioned above.	As per Gazette of Govt. of India, Notification 7th Nov.2016

FINAL YEAR B.D.S. (Sem I) QUESTION PAPER PATTERN

SECTION I (10 MARKS)

[10 Questions @ l mark per question]

I. Multiple Choice Objective Questions

Qtn# 1 Oral Medicine Topic: Red &White lesions

Qtn# 2 Oral Medicine Topic: Vesiculo-bullous - Ulcerative lesions

Qtn# 3 Oral Medicine Topic: Oral Manifestation of Systemic Disease

Qtn# 4 General Medicine Topic: Dental Management of Medically Compromised Patients

Qtn# 5 Oral Radiology Topic: Basic Radiology

Qtn# 6 Oral Radiology Topic: Radiation Hazards

Qtn# 7 Oral Radiology Topic: Radiographic Interpretation

Qtn# 8 Oral Medicine Topic: Laboratory Investigations

Qtn# 9 Forensic Dentistry Topic

Qtf~ # 10 Geriatric Oral Medicine

SECTION II (30 MARKS)

II. LongEssay ***[10 Marks]***

Topic: Clinical features, differential diagnosis and management / treatment of anyOral Mucosal Lesion / Condition / Disease or systemic diseases with oral manifestations. (Question may be split into sub-questions so as to cover wide spectrum of topics)

III. **Short Notes** (Answer any 4 out of 5 @ 5 marks per short note) *[20 Marks]*

i. Differential Diagnosis of any specific Oral Mucosal Lesion / Condition / Disease based on clinical features, routine and advanced laboratory methods/ histopathological features

ii. General and Oral Manifestations / Clinical features, diagnosis and treatment of Infections of Head &Neck / Diseases of the Teeth /Gingiva / Periodontium/ Muco-cutaneous or Dermatological lesions

iii. General and Oral Manifestations /Clinical features and diagnosis of commonly encountered Syndromes / Nutritional deficiencies/Metabolic disorders /Endocrine Disorders/Blood Dyscrasias

iv. Drugs / Pharmacotherapeutic agent used in oral medicine or dental practice/ Evaluation and dental treatment considerations of patient with any specific systemic condition

v. Any topic in Forensic Odontology

SECTION III (30 MARKS)

IV. **Long Essay** *[10 Marks]*

Topic: Physics of Radiology. Question may be split into sub-questions so as to cover wide spectrum of topics under Physics of Radiology, Radiography including techniques and radiographic accessories, Radiation Biology & Protection

V. Short Notes (Answer any 4 out of 5 @ 5 marks per short note) *[20 Marks]*

i. Radiographic Features and Radiographic Differential Diagnosis of any Specific Lesion / Condition / Disease affecting the jaw bones / soft tissues of the head neck face region

ii. Radiographic Technique/Recent advances in Diagnostic &interventional Imaging techniques:- their historical development, underlying principles/ concepts, indications contra-indications, advantages and disadvantages

iii. Basic Radiology (Normal Anatomic Landmarks)

iv. General and Oral Manifestations / Clinical features /radiographic features / diagnosis/ treatment of diseases of the Temporo-Mandibular Joint / Facial pain with implications in oral medicine / dental practice

v. Any topic relating to Clinical features /radiographic features / Diagnosis / Treatment of diseases of the Salivary Glands /Maxillary Sinus

TOTAL MARKS FOR THEORY =

Section I + Section II + Section III= 10 + 30 + 30 = 70 Marks

3.Clinical examination
4. Viva voce

INTERNAL ASSESSMENT EXAMINATION

The continuing assessment examinations may be held frequently at least 3 times in a particular year and the average marks of these examinations should be considered. 10% of the total marks in each subject for both theory, practical and clinical examination separately should be set aside for the internal assessment examinations.

SCHEME OF EXAMINATION:

The scheme of examination for B.D.S. Course shall 'be divided into 1st B.D.S. examination at the end of the first academic year, 2nd B.D.S. examination at the end of second year, 3rd B.D.S. examination at the end of third, 4th B.D.S. at the end of 4th and final B.D.S at the end of 5th year. 240 days minimum teaching in each academic year is mandatory.

The examination shall be open to' a candidate who satisfies the requirements of attendance,progress and other rules laid down by the University.

(1) Universities shall organize admission timings and admission process in such a way that teaching starts from 1st day of August in each academic year.

I B.D.S. Examination:

1. General anatomy including embryology and histology
2. . General human physiology and biochemistry
3. Dental Anatomy, Embryology and Oral Histology

Any student who does not clear the first BDS University Examination in all subjects within 3 years from the date of admission, shall be discharged from the Course.

Anycandidate who fails in one *subject in* an *Examination* is *permitted* to *go* to *the next higher class and appear for the subject and complete it successfully before he is permitted* to *appear for the* next *higher examination.*

II B.D.S. Examination:

A candidate who has not successfully completed the 1st B.D.S. examination can not appear in the IInd year Examination. . .

1. General Pathology and Microbiology
2. General and Dental Pharmacology and Therapeutics
3. Dental Materials .

4.Pre Clinical Conservative - Only Practical and Viva Voce

5. Pre Clinical Prosthodontics - Only Practical and Viva Voce

III B.D.S. Examination:

A candidate who has successfully completed the 2nd B.D.S. examination can appear IIIrd B.D.S.
Examination.

1. General Medicine
2. General Surgery
3. Oral Pathology and Oral Microbiology

IV B.D.S. Examination:

1. Oral Medicine and radiology
2. Paediatric &Preventive Dentistry
3. Orthodontics &Dentofacial Orthopaedics
4. Periodontology

V BDS Examination:

1. Prosthodontics and Crown &Bridge
2. Conservative Dentistry and Endodontics
3. Oral and Maxillofacial Surgery
4. Public Health Dentistry

WRITTEN EXAMINATION:

1. The written examination in each subject shall consist of one paper of three hours duration and shall have maximum marks of 70.
2. In the subjects of Physiology &; Biochemistry and Pathology &; Microbiology each paper will be divided into two parts, A and B of equal marks.
3. The question paper should contain different types of questions like essay, short answer and objective type / M.C.Q's.
4. The nature of questions set, should be aimed to evaluate students of different standards ranging from average to excellent.
5. The question should cover as broad an area of the content of the course. The essay on should be properly structured and the marks specifically allotted.
6. The University may set up a question bank

PRACTICAL AND CLINICAL EXAMINATION :

1. **Objective Structure d Clinical Evaluation:**

The present system of conducting practicaland clinical examination at several universities provide chance for unrealistic proportions ofluck. Only a particular clinical procedure or experiment is usually given for the examination. The clinical and practical examination should provide a number of chances -for the candidate to express one's skills. A number of examination stations "with specific instructions to be provided. This can include clinical procedures, laboratory experiments, appratersetc. Evaluation must be made objective and structured. The method of objective structured clinical examinations should be followed. This will avoid examiner bias because both the examiner and the examinee are given specific instructions on what is to- -be observed at each station.

2. **Record / Log Books** :

The candidate should be given credit for his records based on the scores obtained in the record. The marks obtained for the record in the first appearance can be carried over to the subsequent appearances if necessary.

3. **Scheme of Clinical and Practical Examinations :**

The specific scheme of clinical and practical examinations, the type of clinical procedures /experiments to be performed and marks allotted for each are to be discussed and finalized by the Chairman and other examiners and it is to be published prior to the conduct of the examinations along with the publication of the time table for the practical examinations, This scheme should be brought to the notice of the external examiner as and when the examiner reports. The practical and clinical examinations should be evaluated by two examiners/of which one shall be an external examiner appointed from other universities preferably outside the State. Each candidate should be evaluated by each examiner independently and marks computed at the end of the examination.

4. Viva Voce:

Viva voce is an excellent mode of assessment because it permits a fairly broad coverage and it can assess the problem solving capacity of the student. An assessment related to the affective domain is also possible through viva voce. It is desirable to conduct the viva voce independently by each examiner. In order to avoid vagueness and maintain uniformity of standard and coverage, questions can be pre-formulated before administering them to each student. Twenty marks are exclusivetyallotted for viva voce that can be divided equa11y amongst the examiners, i.e., 10 marks per examiner.

MARKS DISTRIBUTED IN EACH SUBJECT :
Each subject shall have a maximum of 200 marks.
Theory 100
Practical / Clinical 100

Theory – 100		**Practical / Clinical – 100**	
University written exam	70	University exam	90
Viva Voce	20		
Internal; assessment (Written)	10	Internal assessment(Written)	10
Total	100		100

Practical and Viva Voce only in University Examination.
Pre-clinical Prosthodontics
Pre-clinical Conservative Dentistry…
Internal Assessment - 20
Practical – 60
Viva Voce- 20

100

Bachelor of Business Administration [Financial Services]

Programme Structure (from June 2020)

CODE	COURSE	CREDITS	MARKS	COURSE TYPE
SEMESTER ONE				
BFS CC 1	Fundamentals of Accounting	**4**	**100**	**CC**
BFS CC 2	Fundamentals of Management	**4**	**100**	**CC**
BFS CC 3	Microeconomics	**4**	**100**	**CC**
BFS CC 4	Indian Financial System	**4**	**100**	**CC**
BFS AECC 1	Communication Skills	**4**	**100**	**AECC**
BFS AECC 2	Environmental Studies – I	**2**	**50**	**AECC**
Generic Elective Course(ANY ONE)				
BFS GEC 1	Quantitative Skills	**4**	**100**	**GEC**
BFS GEC 2	Fundamentals of Computer Applications	**4**	**100**	**GEC**
	Total	**26**	**650**	
SEMESTER TWO				
BFS CC 5	Essentials of Management	**4**	**100**	**CC**
BFS CC 6	Macroeconomics	**4**	**100**	**CC**
BFS CC 7	Banking in India	**4**	**100**	**CC**
BFS CC 8	Data Analysis and Quantitative Techniques	**4**	**100**	**CC**
BFS AECC 3	Business Communication	**4**	**100**	**AECC**
BFS AECC 4	Environmental Studies - II	**2**	**50**	**AECC**
Generic Elective Course (ANY ONE)				
BFS GEC 3	Research Methodology	**4**	**100**	**GEC**
BFS GEC 4	Cyber Security	**4**	**100**	**GEC**
	Total	**26**	**650**	
SEMESTER THREE				
BFS CC 9	Fee and Fund based Financial services	**4**	**100**	**CC**
BFS CC 10	Direct Taxes	**4**	**100**	**CC**
BFS CC 11	Indian Securities Market	**4**	**100**	**CC**
BFS SEC 1	Principles & Practice of Insurance	**4**	**100**	**SEC**
Generic Elective Course (ANY TWO)				
BFS GEC 5	Financial Management	**4**	**100**	**GEC**
BFS GEC 6	Strategic Management	**4**	**100**	**GEC**
BFS GEC 7	Fundamentals of Marketing	**4**	**100**	**GEC**
	Total	**24**	**600**	
SEMESTER FOUR				
BFS CC 12	Stock Market Operations	**4**	**100**	**CC**
BFS CC 13	Corporate Finance	**4**	**100**	**CC**
BFS CC 14	Entrepreneurship Development	**4**	**100**	**CC**
BFS SEC 2	Financial Statement Analysis	**4**	**100**	**SEC**
Generic Elective course (TWO)				
BFS GEC 8	Cost and Management Accounting	**4**	**100**	**GEC**
BFS GEC 9	Corporate Restructuring	**4**	**100**	**GEC**
BFS GEC 10	OrganisationalBehaviour	**4**	**100**	**GEC**
	Total	**24**	**600**	
SEMESTER FIVE				
BFS CC 15	Security Analysis and Portfolio Management	**4**	**100**	**CC**
BFS CC 16	International Finance and Foreign Exchange Management	**4**	**100**	**CC**
BFS DSEC 1	E-commerce and E-Accounting	**4**	**100**	**DSEC**
BFS DSEC 2	Marketing of Financial Services	**4**	**100**	**DSEC**
BFS DSEC 3	Mutual Fund Management	**4**	**100**	**DSEC**

BFS DSEC 4	Derivatives: Equity and Currency	**4**	**100**	**DSEC**
Total		**24**	**600**	

SEMESTER SIX				
BFS CC 17	Internship and Report	**24**	**600**	**CC**
Total		**24**	**600**	
GRAND TOTAL		**148**	**4100**	

NOTE:

Composition of Total credits:

Core Courses:	16*4	= 64+24 = 88
Ability Enhancement Compulsory Courses:	(2*4) + (2*2)	= 12
Generic Elective Course:	6*4	= 24
Skill Enhancement Course:	2*4	= 08
Discipline Specific Elective Course:	4*4	= 16
Total Credits		**= 148**

BFS CC1: FUNDAMENTALS OF ACCOUNTING (

(4 CREDITS: 100 MARKS)

Objective: *To enable students to understand and apply the principles and practices of accounting.*

UNIT 1: INTRODUCTION20 marks, 10 sessions)

Basic terms of accounting, Accounting Principles, Concepts, Conventions, IND-AS, Accounting Equation, System of accounting: Cash system and mercantile system, Accounting as information system, Users of accounting information.

UNIT 2: ACCOUNTING PROCESS & PROCEDURE (35 marks, 25 sessions)

Transaction/Event, Voucher: Meaning, Types of Vouchers, Receipt (Credit Voucher), Payment (Debit Voucher), Journal (Accrual) Voucher, Journal, Cash Book (double and triple column, journal proper), Ledger, Trial Balance.; Bank Reconciliation Statement- Meaning and need; Causes of disagreement.

UNIT 3: FINANCIAL STATEMENTS (20 marks, 10 sessions)

Forms of financial statements, Practical Problems on Vertical form (Income statement and Balance Sheet with and without schedules)

(25 marks, 15 sessions)

UNIT 4: DEPRECIATION ACCOUNTING

Meaning; Methods of Depreciation: Straight line method, Reducing balance method, Annuity method, Sinking fund method, Insurance Policy method, Machine Hour Rate, Replacement Method, Revaluation Method and Depletion Method. (Practical problems on First 2 methods only.)

Recommended Readings:

- Gupta R. L. (1982):Problems and Solutions in Advanced Accounting, New Delhi, Sultan Chand, 8eHanif M. & Mukherjee A. (2000):
- Modern Accountancy (Volumes I & II),New Delhi, Tata McGraw-Hill, 2e
- Maheshwari S. N. (2001): Advanced Accounting, New Delhi, Vikas, 8e

Shukla M.C. & Grewal T. S. (1996): Advanced Accounting, New Delhi,

Learning Outcomes: After studying this course students will be able to prepare the Final accounts of a Sole trading concern and a Partnership firm.

BFS CC 2: FUNDAMENTALS OF MANAGEMENT

(4 CREDITS: 100 MARKS)

Objective: *To acquaint the student with the basic concepts, principles and practices of business management, using case studies to supplement classroom teaching with real -life applications.*

UNIT 1: INTRODUCTION TO MANAGEMENT (25 marks, 10 sessions)

Meaning and Definition of Management, Management Concepts, Scope of Management, Managerial Levels, Principles of Management, Types of Managers, Characteristics of good Manager, Managerial Roles, Managerial responsibility, Management v/s Administration, Management Challenges.

UNIT 2: FUNCTIONS OF MANAGEMENT (25 marks, 10 sessions)

Management process, Planning- Meaning- Definition- Importance- Steps, Organising- Meaning- Definition- Importance- Classification of Organisation- Steps, Staffing- Meaning- Importance, Process, Directing- Meaning- Importance- Elements of Directing, Supervision, Motivation, Leadership & Communication, Controlling- Meaning- Importance- Techniques- Process

UNIT 3: MANAGEMENT ENVIRONMENT (25 marks, 20 sessions)

Operating environment, Generic environment, Economic dimension, Technological dimension, Socio-cultural dimension, Political & Legal dimension, International dimension, Task environment- Clients, competitors, suppliers, regulation, labour, Internal environment- Board of directors, employees, processes, cultures, climate.

UNIT 4: SOCIAL RESPONSIBILITY OF MANAGEMENT & BUSINESS ETHICS

(25 marks, 20 sessions)

Levels of Social Responsibility, Interest groups, Arguments for and against Social Responsibility, Case Study on Social Responsibility

Business Ethics**:** Meaning and Definition, Need and Importance, Principles of Ethics, Factors, Code of Ethics, Case study on Business Ethics.

Recommended Readings:

- Burton G. & Thakur M.: Management Today–Principles & Practices, New Delhi, Tata McGraw-Hill.
- Chandan J. S: Management Theory & Practice, New Delhi, Vikas publishing house private ltd.

Learning Outcomes: After studying this course, students should be able to understand what is meant by management and managerial effectiveness and also identify the roles which are fulfilled while working as a manager

BFS CC3: MICROE CONOMICS

(4 CREDITS: 100 MARKS)

Objectives:*To provide students with an understanding of the basic tools of economics and their application in business; to develop students' analytical abilities in the area of business economics.*

UNIT 1: INTRODUCTION (10 marks, 5 sessions)

Introduction to economics- definition, scope and subject-matter; basic economic problems; micro economics and macroeconomics; meaning and scope of business economics; basic concepts in economics; market and command economies.

UNIT 2: DEMAND AND SUPPLY ANALYSIS (20 marks, 10 sessions)

Demand Analysis- concept, determinants and demand function, law of demand, demand schedule, and demand curve, expansions tool of demands, individual and market demand, rationale for law of demand(brief explanation of price effect, income effect and substitution effect); demand distinctions, elasticity of demand-types (price, income, cross and promotional), measurement, determinants and use of concepts of elasticity.

Supply Analysis- concept, determinants and supply functions, law of supply, supply schedule and supply curve, elasticity of supply.

UNIT 3: PRODUCTION AND COST ANALYSIS (30 marks, 20 sessions)

Production- meaning, production function-short- run and long-run, concept,-total, marginal and average product, interrelationship , law of variable proportions-schedule and diagram , stages Return to scale- increasing, decreasing and constant returns to scale, economies and diseconomies of scale.

Cost analysis- concepts- private and social cost, opportunity cost, money cost, economic and accounting costs, short –run costs and long run costs- fixed and variable, total, average and marginal, cost schedules and cost curves.

UNIT 4: MARKETS & PRICING (40 marks, 25 sessions)

Markets: Meaning, revenue concepts and curves, types of market structure- perfect competition, monopoly, monopolistic competition, oligopoly-features, short-run and long-run price output decisions of the firm under each market structure, cartels and price leadership under oligopoly, price discriminations- meaning and conditions.

Pricing: Price output determination, equilibrium analysis- shifts in demand and supply and impact on equilibrium, time element, pricing methods- cost plus pricing, skimming price and penetration price, administered prices, dual prices, pricing over the life cycle of the product.

Recommended Readings:

1. Begg D, Fischer S & Dornbusch R. (1984) : Economics, London, McGraw-Hill
2. Colander D.C (1994): Economics, Boston, Irwin
3. Dean J. (1992): Managerial Economics, New Delhi, Prentice- Hall of India
4. Mehta P. L. (1999): Managerial Economics- Analysis, problems & cases, New Delhi, Sultanchand and sons.6e

Learning Outcomes: Upon successful completion of the course a student will be able to apply economic principles to management decisions & understand the basic forces governing the operation of competitive market and also distinguish relevant from irrelevant costs for economic decision-making.

BFS CC 4: INDIAN FINANCIAL SYSTEM

(4 CREDITS: 100 MARKS)

Objectives:*To acquaint students with the structure and components of the Indian Financial System; to familiarize students with different types of financial institutions and their place in the Indian Financial System.*

UNIT 1: INTRODUCTION TO FINANCIAL SYSTEM (25 marks, 15 sessions)

Savings – Meaning – Need – Emergence – Investment – Meaning –– Savings v/s Investment – Objectives of Investment – Role of Savings

Financial System- Meaning – Structure – Functions –Development of Financial system in India – Financial system & Economic Development – Weakness of Indian Financial System.

UNIT 2: FINANCIAL INSTITUTIONS& FINANCIAL INSTRUMENTS

(35 marks, 20 sessions)

A. Financial Instruments

Meaning,importance and classification of financial instruments-Short Term Instruments, Medium Term Instruments, Long Term Instruments - Primary Securities, Secondary Securities.-Innovative Instruments.

B. Financial Institutions

Meaning, Functions and Role of Financial Institutions- Banking and Non-banking Financial Institutions

UNIT 3: FINANCIAL MARKETS (30 marks, 15 sessions)

Meaning, Role, Functions of financial markets.-Money Market: Call Money Market, Commercial Bill market; Treasury Bill market-Capital Market: Primary Market, Secondary Market, Derivative Market - Meaning, features, Participants in all.

UNIT 4: FINANCIAL SERVICES (10 marks, 10 sessions)

Meaning, importance and types of Financial Services-Fund Based services and Fee Based services

Recommended Readings

- Bhole L. M. & Mahakud J. (2009): Financial Institutions and Markets: Structure, Growth & Innovations, New Delhi, Tata-McGraw Hill, 5e
- Pathak B. V. (2008): Indian Financial System, New Delhi, Pearson, 2e
- Desai V. (2005): The Indian Financial System and Development, Mumbai, Himalaya
- Gordon & Natarajan: Financial Markets & Institutions, Himalaya

Learning Outcomes: Upon successful completion of the course a student will be able to understand the basic structure of Indian Financial System and also the various financial services available.

BFS AECC 1: COMMUNICATION SKILLS

ABILITY ENHANCEMENT COMPULSORYCOURSE

(4 CREDITS: 100 MARKS)

Objectives: *To enable the student to communicate effectively and confidently, facilitate interpersonal communication, understand etiquette and to be a good public speaker, the student will be able to communicate in writing effectively, to write reports effectively, to draft communication related to meetings*.

UNIT 1 – INTRODUCTION TO COMMUNICATION SKILLS (15 marks, 10 sessions)

What is Communication- Channels of Communication- Barriers to effective communication and how to overcome them.

UNIT 2 – PUBLIC SPEAKING (25 marks, 10 sessions)

Preparation and developing the topic-Opening a talk and closing a talk-Rehearsing the talk.-Presenting the talk-Drafting frequently made speeches such as welcome, introducing a speaker, a short talk and vote of thanks.

UNIT 3- WRITTEN COMMUNICATION (30 marks, 20 sessions)

A) Introduction to Written Communication

Objective comprehension - Subjective comprehension

B)Report Writing

Methods of collecting data for report- Kinds of reports-What a report contains-Individual reports-Committee reports.How to write a report.

C) Meetings

Drafting Notice and Agenda- Chairing meetings- Drafting Minutes of meetings.

UNIT 4: E- COMMUNICATION (30 marks, 20 sessions)

A) Introduction to Commercial Correspondence

Principles of commercial correspondence-Language in a business letter including jargon-Parts of a business letter

B) Letter Writing

Formal Letters – Job Application Letter, Resume, C.V, Acceptance Letter and Resignation Letter-Informal Letters – Letter of gratitude, letter of appreciation, letter of invitation, letter of apology and letter of condolence

C)Interviews

Types of interviews -Types of interviewers - Candidate's preparation for a job interview-Planning and conduct of a job interview

Suggested Readings

- M. K. Sehgal & V. Khetrapal - Business Communication (Excel Books).
- Rajendra Pal – Business Communication (Sultan Chand & Sons Publication)
- P. D. Chaturvedi – Business Communication (Pearson Education, 1st Edition 2006)
- Lesikar RV & Pettit Jr. JD – Basic Business Communication: Theary& Application

  (Tata Mc Graw Hill 10th Edition

- Tayler Shinley – Communication for Business (Pearson Education, 4th Edition)

Learning Outcomes: Upon successful completion of the course a student will be able to communicate effectively and confidently.

BFS AECC 2: ENVIRONMENTAL STUDIES - I

ABILITY ENHANCEMENT COMPULSORYCOURSE

(2 CREDITS: 50 MARKS)

Objectives*: To facilitate students with basic understanding about the complex linkages of multidisciplinary nature of environmental studies and gain knowledge about the valuable environmental resources; to sensitise the student community about current environmental issues and educate them concerning their role in protection of the environment.*

UNIT I: THE MULTIDISCIPLINARY NATURE OF ENVIRONMENTAL STUDIES

(05 Marks -03 Sessions)

Definition, scope and importance, Need for public awareness

UNIT II: NATURAL RESOURCES (15 Marks – 10Sessions)

Natural resources: Renewable and Non Renewable and its associated problems

a) Forest resources: Use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forests and tribal people.

b) Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams - benefits and problems.

c) Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies.

d) Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, case studies

e) Energy resources: Growing energy needs, renewable and non- renewable energy sources, use of alternate energy sources. Case studies

f) Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification.

Role of an individual in conservation of natural resources

UNIT III: ECOSYSTEMS (15 Marks – 07 Sessions)

Concept of an ecosystem; Structure and function of an ecosystem

Producers-consumers-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, oceans, estuaries).

UNIT IV: BIODIVERSITY AND ITS CONSERVATION **(15 Marks – 10 Sessions)**

Introduction - Definition: genetic, species and ecosystem diversity; Bio-geographical 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.

Recommended Readings:

1. Agarwal, K.C.2001 Environmental Biology, Nidi Pub. Ltd. Bikaner.
2. Bharucha Erach, The Biodiversity of India, Mapin Publishing Pvt. Ltd. , Ahmedabad - 380013, India, Emai1: mapin@icenet.net (R)
3. Brunner RC., 1989, Hazardous Waste Incineration, McGraw Hill Inc.480p
4. Clark RS., Marine Pollution, Clanderson Press Oxford (TB)
5. Cunningham, W.P.Cooper, TH.Gorhani, E & Hepworth, M.T2001, Environmental Encyclopedia, Jaico Pub!. House, Mumbai, 1196p
6. De A.K., Environmental Chemistry, Wiley Eastern Ltd.
7. Down to Earth, Centre for Science and Environment(R)
8. Gleick, H.P. 1993. Water in crisis, Pacific Institute for Studies in Dev., Environment & Security. Stockholm Env. Institute. Oxford Univ. Press. 473p
9. Hawkins R.E, Encyclopedia of Indian Natural History, Bombay Natural History Society, Bombay (R)
10. Heywood, VH & Watson, R.T. 1995. Global Biodiversity Assessment. Cambridge Univ. Press 1140p.

Learning Outcomes: *Upon successful completion of the course a student will be able to understand the wideness and multidisciplinary nature of environmental studies and will be accomplished to find the practical solutions to solve and prevent from the various environmental issues.*

BFS GEC 1: QUANTITATIVE SKILLS

GENERIC ELECTIVE COURSE

(4 CREDITS: 100 MARKS)

Objective:*To develop the students' quantitative skills and to make them proficient in various quantitative techniques which are essential and useful in the world of business and finance.*

UNIT 1: INTRODUCTION TO STATISTICS (20 marks, 10 sessions)

Data classification; tabulation and presentation: meaning, objectives and types of classification, formation of frequency distribution. Role of tabulation, parts, types and construction of tables, significance, types and construction of diagrams and graphs

UNIT 2: THEORY OF EQUATIONS (25 marks, 15 sessions)

Meaning, type of equations-simple linear and simultaneous equations (only two variables) eliminations and substitution method;

Quadratic equations-factorization and formula method (ax +bx + c =0 form) Problems on commercial application.

UNIT 3: PROGRESSIONS (25 marks, 15 sessions)

Arithmetic progressions-finding the n th term of an AP and also sum to 'n' terms of an AP, an AP insertion of Arithmetic means in given terms of AP and representation of AP.

Geometric progression: finding n th term of GP, Insertion of GMs in given and representa tion of GP.

UNIT 4: COMMERCIAL ARITHMETIC (30 marks, 20 sessions)

Ratio and Proportion, Percentages Discount, Commission and Brokerage, Profit & LossSimple interest, compound interest (including half yearly and quarterly calculation), annuity; discounting, present and future value

Recommended Reading:

- Arora P.N. & Arora S. (2006): Mathematics, CA-Professional Education (Course-I), [Chapter 11-Mathematics of Finance], New Delhi, Sultan Chand, 9e
- Dikshit A & Jain J.K. (2005): Business Mathematics, Mumbai, Himalaya, 1e
- Goel A. & Goel A. (2005): Mathematics and Statistics for CA Professional Examination, New Delhi, Taxmann, 3e

Learning outcomes: After studying this course students will be in the position to apply the quantitative techniques in the world of business and finance.

BFS GEC 2: FUNDAMENTALS OF COMPUTER APPLICATIONS

GENERIC ELECTIVE COURSE

(4 CREDITS: 100 MARKS)

Objectives*: To familiarize the students with computers and their use, and make them proficient in the use of software packages that are relevant to business, finance and accountancy*

UNIT 1: FUNDAMENTAL CONCEPTS (20 marks, 13 sessions)

Introduction to Computer Systems; Block Diagram of a Computer, basic functions of each component, classification of Digital Computers based on size, uses of computers; Operating System Basics – Role of Operating system, Features of the Internet, Accessing the Internet, Working on the Internet.

Networks & Data Communication – The Uses of a Network, How Networks are Structured, Network Topologies, Media & Hardware; The Internet & Online Resources How Internet Works, Features of the Internet, Accessing The Internet Working on the Internet

UNIT 2: WORD PROCESSING & SPREADSHEETS (50 marks, 32 sessions)

Using MS – Word & MS – Excel

UNIT 3: DATABASE MANAGEMENT SYSTEM & BUSINESS PRESENTATION PACKAGES (20 marks, 10 sessions)

Using MS-Access and MS- PowerPoint

UNIT 4: MANAGEMENT INFORMATION SYSTEMS (10 marks, 5 sessions)

Need for MIS, use of computers for MIS, decision support systems.

Recommended Reading:

- Agarwal N. (2002): financial accounting on computer using tally
- Cassell P. & Palmar P. (2000): Teach yourself Microsoft Access 2000 in 21 days
- Curtin D. (1998): Information Technology- The Breaking Wave
- Jane S. (1999): 'O' level module-I made simple information technology

Learning outcomes: After studying this course students will be in the position to use the software packages that are relevant to business.

BFS CC 5: ESSENTIALS OF MANAGEMENT

(4 CREDITS: 100 MARKS)

Objective: *To acquaint the student with the basic concepts, principles, practices and strategies of business management, using case studies to supplement classroom teaching with real -life applications.*

UNIT 1:MANAGERIAL ROLE (35 marks, 20 sessions)

Leadership – Meaning, Need, Functions, Qualities, Styles, Theories – Trait, Behavioural, Situational; Motivation – Meaning, Importance, Theories – Need Hierarchy, X & Y, Hertzberg's; Communication – Meaning, Importance, Types, Barriers, Overcoming barriers, Guidelines; Co-ordination, Direction, Staffing, Budgeting (in brief)

UNIT 2:MANAGEMENT OF CHANGE (25 marks, 15 sessions)

Meaning and definition, Types, Process: resistance to change, causes, Guidelines, Planned change process, Organizational development: definition, characteristics, objectives, need and steps, Case study.

UNIT 3:DETERMINANTS OF INDIVIDUAL BEHAVIOUR (25 marks, 15 sessions)

Concept, Structure, Types of Organization, Significance of Organizational Behaviour., Individual Behaviour- Meaning, Perception-Meaning, Factors influencing Perception, Perceptual Process, Personality- Meaning-Determinants of Personality; Attitude- Meaning-Nature of Attitude-Components of Attitude, Values- Meaning.

UNIT 4: TEAM WORK AND CONFLICT MANAGEMENT (15 marks, 10 sessions)

Nature of teams, types, reasons and stages in team formation.Conflict: meaning, causes, types and conflict management.

Recommended Readings:

- Chandan J. S. (1997): Management Theory and Practice, New Delhi, Vikas
- Prasad L. M. (1998): Principles of Management, New Delhi, Sultan Chand & Sons
- Prasad M. (2003): Management Concepts and Practices, Mumbai, Himalaya
- Sadler P. (1996): Managing Change, London, Kogan
- Sherlekar S. A., Appannaiah H. R. & Reddy P. N. (2003): Business Management, Mumbai, Himalaya, 1e
- K. Aswathappa "Organisational Behaviour" Himalaya Publishing House

Learning outcomes: After studying this course students will be able to understand the individual behaviour and also be able to face and manage conflicts in the organisation.

BFS CC 6: MACROECONOMICS

(4 CREDITS: 100 MARKS)

Objectives: *To familiarise students with the basic concepts of macroeconomics and its relevance for business decision making.*

UNIT 1: THEORY OF INCOME AND EMPLOYMENT (25 marks, 15 sessions)

A. INTRODUCTION

Nature; Scope; Macroeconomics; Issues in an economy; Introduction to national income, concept of GDP and national income; Measurement of national income and related aggregates, nominal and real income

B. NATIONAL INCOME DETERMINATION

Actual and potential GDP; Aggregate expenditure- consumption function & Investment function; Equilibrium GDP; concepts of marginal and average propensities to save and consume; concept of multiplier & accelerator

National income determination in an open economy with government- fiscal policy- impact of changes in govt. Expenditure and taxes, net export function: net exports and equilibrium GDP.

UNIT 2: MONEY AND BANKING (25 marks, 15 sessions)

Definition of money; Functions of money; Demand for money; Classical and Keynesian application; Supply of money- role of government, central bank and commercial banks; Process of multiple credit creation; Near money, RBI measures of money supply

UNIT 3: PUBLIC FINANCE (25 marks, 15 sessions)

Budget – meaning, types (balanced & unbalanced, surplus & deficit); concepts of deficit (fiscal deficit, revenue deficit, primary deficit);

Public revenue: sources of govt. revenue; Public expenditure: classification-developmental/ non-developmental, plan/non-plan, functional ; Public debt: meaning; classification- internal & external, short- medium- & long term, productive & unproductive, redeemable & irredeemable; Discussion of most recent GOI budget

UNIT 4: BUSINESS CYCLES **(25 marks, 15 sessions)**

Business cycle: meaning and features; Phases of business cycle; Theories of business cycles, Inflation, deflation: meaning, nature, causes and types; The Philips curve. Stagflation-meaning

Recommended Reading:

- Diulio E.(1998): Macroeconomics, Schaum's Outline Series, New Delhi, Tata McGraw-Hill,3e
- Dornbusch R. , Fisher S. & Startz R. (1998): Macroeconomics, New Delhi, Tata McGraw-Hill, 7e
- Farmer R.E.A. (2002): Macroeconomics, Singapore, Thomson-South Western, 2e

Learning outcomes: After studying this course students will be able to understand the individual behaviour and also be able to face and manage conflicts in the organisation.

BFS CC 7: BANKING IN INDIA

(4 CREDITS: 100 MARKS)

Objective:*To provide students with an overview of commercial banking in India; to familiarise students with the regulatory framework of banks in India.*

UNIT 1: INTRODUCTION (25 marks, 20 sessions)

Definition(as per Banking Regulation Act) and meaning of banking, and importance of banks, structure of Indian Banking system- Scheduled and Non-Scheduled, commercial, cooperative and regional rural banks.; Meaning, nature, definition and importance of commercial banks, Growth, development and weaknesses of Indian Commercial Banking system from nationalisation to reforms (in brief); Banking sector reforms and development in banking since 1990's; Relative importance of public sector banks, private sector banks and foreign banks.

UNIT 2: FUNCTIONS OF BANKS (25 marks, 10 sessions)

a) **Accepting deposits**: types of deposits- saving, current, fixed, recurring, pigmy and other deposits, d-mat accounts, deposits at call and short notice, KYC forms to be followed while opening accounts.

b) **Deployment of Advances:** Types of advances- loans, cash credit, bank overdraft, temporary overdraft, clean and secured advances, bridge loans, participation loans, purchase of bills, bill discounting, Principles of secured advances, Lien, Pledge, Hypothecation, Mortgage- Features and Differences.

c) **Other functions**-Remittances, Generic utility and agency functions.

UNIT 3: RESERVE BANK OF INDIA (20 marks, 15 sessions)

Functions of RBI as India's Central Bank: Traditional and Promotional functions.

Monetary policy – meaning; Instruments of credit control/ monetary policy - Quantitative (variable reserve requirements, open market operations, bank rate, liquidity adjustment facility through repo and reserve repo rate); Qualitative instruments.

UNIT 4: TECHNOLOGY IN BANKING (30 marks, 15 sessions)

Electronic Banking - Introduction, Impact of information technology on banking, Conventional systems: Demand drafts, pay orders and cheques and their clearing, drawbacks/difficulties of these systems. Electronic fund transfer system: RTGS, NEFT & SWIFT. Electronic Clearing Systems (ECS).Debit & Credit cards, Automated Teller Machines (ATMs), PIN, Signal storage and Retrieval, CC Banking. Recent trends and developments in banking technology: CTS; Note & Coin Counting & Vending Machines; Microfiche; Banking payment intermediaries –RUPAY, VISA, Mastercard etc. Mobile banking apps and security considerations, Risk Concern Areas relating to IT in Banks, Types of Threats in E-banking;

Recommended Readings

- Bedi H. L. &Hardikar V. K. (1993): Practical Banking Advances, New Delhi, UBS, 9e
- Burton M. &Lombra R. (2000): The Financial System and the Economy: Principles of Money and Banking, Australia: South-Western College
- Gordon E. & Natarajan K. (1998): Banking Theory, Law and Practice, Mumbai, Himalaya
- Indian Institute of Banking and Finance (2008): Principles & Practices of Banking, New Delhi, Macmillan, 2.

Learning outcomes: After studying this course students will be able to understand the Banking system in India and the significance of Reserve Bank of India as the central bank of the country.

BFS CC 8: DATA ANALYSIS AND QUANTITATIVE TECHNIQUES

(4 CREDITS: 100 MARKS)

Objectives: *To develop the student's quantitative skills and make them proficient in various statistical techniques which are useful in the world of business and finance.*

UNIT 1: TIME SERIES ANALYSIS AND NON PARAMETRIC TESTS

(30 marks, 20 sessions)

Time series Analysis – Components of Time Series, Measurement of Trend Values, Forecasting based on Time series Analysis- ANOVA and Non-parametric Tests: Least Square Method.

UNIT 2: CORRELATION AND REGRESSION ANALYSIS (30 marks, 20 sessions)

Correlation: Meaning, types of correlation, scatter diagram, Karl Pearson's coefficient of correlation, Spearman's rank correlation coefficient

Regression: meaning, lines of regression, regression coefficients, relation between correlation and regression coefficients.

UNIT 3: PROBABILITY THEORY (20 marks, 10 sessions)

Meaning, Basics of permutations and combinations, Elementary probability, Addition and Multiplication theorem on probability, conditional probability, probability distribution- binomial, Poisson and normal distribution.

UNIT 4: INDEX NUMBERS (20 marks, 10 sessions)

Meaning, Classification, construction of index numbers, methods of constructing index numbers- simple aggregative, simple average of price relative, weighted aggregative and weighted average of price relative, limitations and uses of index number.

Recommended Readings:

- Anderson D. R., Sweeney D. J. & Williams T. A. (2002): Essentials of Statistics for Business and Economics, London, South-Western College Publishing, 2e
- Jhamb L. C. (1987): Cases and Problems in Quantitative Techniques, Pune, Everest Pub.
- Mithani D. M. (2001): Quantitative Techniques, Mumbai, Himalaya
- Schaum‟s Outline (1972): Theory & Problems of Statistics, New York, McGraw-Hill
- Tulsian P. C. (2002): Quantitative Techniques, New Delhi, Pearson Education Asia
- Vohra N. D. (1990): Quantitative Techniques in Management, New Delhi, McGraw-Hill
- S. C. Gupta:Fundamentals of Statistics
- R. J. Shah: Statistical Techniques, Sheth Publishers Pvt. Ltd.

Learning outcomes: After studying this course it will help the students to analyse the data. They will be able to identify the dependent and independent variables and conduct analysis on financial data.

BFS AECC 3: BUSINESS COMMUNICATION

ABILITY ENHANCEMENT COMPULSORYCOURSE

(4 CREDITS: 100 MARKS)

Objectives: To improve the students' basic oral and written communication capabilities; to improve the student's oral and written business communication skills

UNIT 1: BASIC LANGUAGE SKILLS (20marks, 15 sessions)

Grammar & Writing Skills: Paragraph Writing, Correction of sentences. Vocabulary

UNIT 2: ORAL & PRESENTATION SKILLS (15 marks, 15 sessions)

Oral Skills: Effective oral communication; Characteristics of oral communication; Group Discussion; Role Play; Debate

Presentation Skills: Planning, Preparing, Practicing, Presenting

UNIT 3: BUSINESS LETTERS (35 marks, 15 sessions)

Letter writing -Formats of letters, Writing different types of letters Trade Enquiries -Orders and their Execution -Credit and Status Enquiries –Complaints and Adjustments -Collection Letters –Sales Letters – Circular Letters.

UNIT4: WRITING SPEECHES AND **CREATIVE WRITING (30marks, 15 sessions)**

Speeches–Motivational Speech, Informative speech, Special Occasion Speech

Creative writing: Create documents in genres such as short stories, essays, biographies, newspaper article etc.

Recommended Readings:

- Bowman J. P. & Branchaw B. P.: Business Report Writing, Holt Saunders, International ed.
- Crannell K. C. (2000): Voice and Articulation, California, Wadsworth, 4e
- Doctor R. & Doctor A. (1987): The Principles and Practices of Business Communication, Mumbai, Sheth
- Grobeck B. E., German K., Ehninger D. & Monroe A. H. (1992): Principles of Speech Communication, New York, HarperCollins
- Fischer D.: Communication in Organisations, New Delhi, Jaico
- Jones L. & Alexander R. (1996): NewInternational Business English –Workbook, Cambridge, Cambridge University Press

Learning outcomes: After studying this course, students are expected to improve their oral and written communication skills.

BFS AECC 4: ENVIRONMENTAL STUDIES - II

ABILITY ENHANCEMENT COMPULSORYCOURSE

(2 CREDITS: 50 MARKS)

Objectives*: To sensitise the student community about different environmental issues; to educate them about their role in prevention of environmental degradation and to find out practical solutions to various environmental problems.*

UNIT I: ENVIRONMENTAL POLLUTION **(15 Marks – 09 Sessions)**

Definition, causes, effects and measures to control - a) Air pollution b) Water pollution c) Soil pollution d) Marine pollution e) Noise pollution f) Thermal pollution g) Nuclear hazards; Solid Waste Management: causes, effects and control measures of urban and industrial wastes; Role of an individual in prevention of pollution and environmental degradation; Pollution case studies; Disaster Management and Mitigation: floods, earthquake, cyclone and landslides. **(15 Marks -09Sessions)**

UNIT II: SOCIAL ISSUES AND THE ENVIRONMENT

Urban problems 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

Various Acts related to environment: Environment Protection Act (1986), Air (Prevention and Control of Pollution) Act (1981), Water (Prevention and control of Pollution) Act (1974), Wildlife Protection Act (1972), Forest Conservation Act (1980); Issues involved in enforcement of environmental legislation

UNIT III: HUMAN POPULATION AND THE ENVIRONMENT

(15 Marks -09 Sessions)

Population growth, variation among nations, population explosion – problems, National Family Welfare Programme(NFWP); HIV/AIDS; Environment and human health; Human rights; Value education; Women and child welfare; Role of Information Technology in environment and human health

UNIT IV: FIELD WORK **(05 Marks – 03 Sessions)**

Visit to a local area to document environmental assets-river /pond/forest/ Grassland/ slopes/hill/ mountain; Visit to a local polluted site; Urban-rural, industrial-agricultural area; Visit to a Solid Waste Treatment Plant; Study of common plants, insects, birds

Recommended Readings:

1. Agarwal, K.C.2001 Environmental Biology, Nidi Pub. Ltd. Bikaner.
2. Bharucha Erach, The Biodiversity of India, Mapin Publishing Pvt. Ltd. , Ahmedabad - 380013, India, Emai1: mapin@icenet.net (R)
3. Brunner RC, 1989, Hazardous Waste Incineration, McGraw Hill Inc.480p
4. Clark RS, Marine Pollution, Clanderson Press Oxford (TB)
5. Cunningham, W.P.Cooper, TH.Gorhani, E & Hepworth, M.T2001, Environmental Encyclopedia, Jaico Pub!. House, Mumbai, 1196p
6. De A.K., Environmental Chemistry, Wiley Eastern Ltd.
7. Down to Earth, Centre for Science and Environment(R)
8. Gleick, H.P. 1993. Water in crisis, Pacific Institute for Studies in Dev., Environment & Security. Stockholm Env. Institute. Oxford Univ. Press. 473p
9. Hawkins R.E, Encyclopedia of Indian Natural History, Bombay Natural History Society, Bombay (R) 10. Heywood, VH & Watson, R.T. 1995. Global Biodiversity Assessment. Cambridge Univ. Press 1140p.

Learning Outcomes: *After completing this course student will be able to understand the various ways through which environment is getting damaged and will be able to find out realistic solutions to resolve and prevent from these problems.*

BFS GEC 3: RESEARCH METHODOLOGY
GENERIC ELECTIVE COURSE

(4 CREDITS: 100 MARKS)

Objective: *To enable the students to understand the relevance & process of research for management & to acquaint the students with research methods and impart basic skills to undertake research.*

UNIT 1: INTRODUCTION (35 marks, 20 sessions)

Meaning of Research; Characteristics of Good Research; Importance of Research; Scientific Thinking – Deduction & Induction; Types of Research; Hypothesis Formulation; Research Process – Clarifying the Research Question, Formulating the Research Proposal, Research Design, Data Collection, Analysis and Interpretation & Reporting the Results.

UNIT 2: SOURCES & COLLECTION OF DATA (35 marks, 20 sessions)

Types of Data – Quantitative, Qualitative & Mixed Data; Methods of Data Collection – Primary Data & Secondary Data – Features, Merits & Demerits of both; Primary Data Sources – Observation Method & Survey Method (Personal Interviews, Telephone Interviews & Self-Administered Surveys); Secondary Data Sources – Published Data & Unpublished Data, Gathering, Recording & Organizing Secondary Data; Designing the Instrument – Features & Essentials of a Good Questionnaire, Question Structure, Question Content, Question Wording & Response Strategy.

UNIT 3: SAMPLING DESIGN (15 marks, 10 sessions)

Sampling Concepts – Universe, Population & Sample, Sampling Terminologies, Need for Sampling; Characteristics of a Good Sample; Sampling Methods – Probability Sampling, Non-Probablity Sampling & Mixed Sampling; Sampling Design – Steps, Sample Size & Sampling & Non-Sampling Errors & Biases.

UNIT 4: DATA ANALYSIS &PRESENTING RESULTS (15 marks, 10 sessions)

A. Data Preparation & Preliminary Analysis – Editing, Coding & Data Entry; Exploring, Displaying & Examining Data – Bar Graph, Histogram, Frequency Table, Pie Chart, Cross Tabulation, Percentage Analysis, Stem & Leaf Display; Using Actual Data to Create Charts in Microsoft Excel.

B. Written Report – Components (Prefatory Items, Introduction, Methodology, Findings, Conclusions, Bibliography & Appendices); Characteristics of Good Report; Presentation Considerations & Usage of Microsoft PowerPoint for Presentation.

Students should be taught how to use a statistical package such as SPSS for simple problems and analyzing output.

Recommended Readings:

- Cooper D. R. & Schindler P.S. (2003): Business Research Methods, New Delhi, Tata McGraw-Hill.
- Goode W. J. & Hatt P. K. (1989): Methods in Social Research, Singapore, McGraw-Hill.
- Ostle B. (1966): Statistics in Research, Mumbai, Oxford & IBH.
- Young P. V. (1996): Scientific Social Surveys & Research, New Delhi, Prentice-Hall.

Learning Outcomes: After studying this course the students will learn to use research methodology to identify & provide solutions to research problems & also write research papers.

BFS GEC 4: CYBER SECURITY

GENERIC ELECTIVE COURSE

(4 CREDITS: 100 MARKS)

Objective:*To familiarise students with corporate IT security, e-commerce security and organisational security.*

UNIT 1: FUNDAMENTAL CONCEPTS (20 marks, 10 sessions)

Introduction to Computer Systems; Block Diagram of a Computer, basic functions of each components, classification of Digital Computers based on size, uses of computers; Operating System Basics – Role of Operating system, Features of the Internet, Accessing the Internet, Working on the Internet.

Networks & Data Communication – The Uses of a Network, How Networks are Structured, Media & Hardware; The Internet & Online Resources How Internet Works, Features of the Internet, Accessing The Internet Working on the Internet

UNIT 2: CYBER THREATS (25 marks, 15 sessions)

Basics:Definition - Cyber Threats , Cyber Attack, Cyber Crime; Cyber Attackers –Hackers, Hactivists, Rogue Insiders, States/Nations etc; Types of Cyber Attacks: Device compromise, Service disruption, Data Exfilteration, Advance Persistent Threat(APT) ; Cyber Attack Artifacts: Viruses, Worms, Trojan Horse, Denial of Service (DoS,DDoS); Phishing, Social Engineering, Zero Day Attack, Cyber Stalking; E-Mail Spoofing, Cyber Warfare, Cyber Espionage, Cyber Vandalism; Vulnerabilities and Countermeasures:Causes of each cyber-attacks type; Countermeasures to tackle each Cyber Attack artifacts.

UNIT 3:ONLINE SHOPPING: PRIVACY AND SECURITY (25 marks, 15 sessions)

Basics – Privacy, Sensitive Personal Information, Advantages & Disadvantages of Online Shopping.; Privacy Issues: Cookies and online tracking; Sharing Information when Shopping Online, Password Protection,; Privacy Policies; Problems associated with online shopping: Data Pharming; Hijackers, Spoofing, Online Fraud.; Safety measures in online Shopping: Encryption of Data Authentication (SSL, Digital Signature, Certificates, Hashing); Security Tokens; Steps to safeguard online shopping security and privacy.; Payments Methods: Different payment methods in online transactions, Safety practices, Best payment method(s).

UNIT 4: CYBER LAWS AND CYBER FORENSIC

(30 marks, 20 sessions)

Information Technology Act(ITA) 2000 : Definition and Terminology - Internet Governance, E-Record, E-Contract, E-Forms, Adjudicating Officer, Affixing Digital signature, Certifying Authority, Sections - Section 43, Section 65.

Information Technology (Amendment) (ITAA) Act 2008: Terminology - Communication Devices, Electronic Signature, Sections: Section 66, Section 67.

Provisions/Laws related to e-commerce, Issues not covered under ITA & ITAA, Reporting cyber-crimes.

Digital Evidence: Definition, Categories of Evidence, Types of Evidence, Admissibility of Evidence, Forensic Examination Standards. Forensic Investigation Steps: Evidence Collection, Preserving Digital Evidence – Special Considerations, Recovering Digital Evidence, Documenting Evidence, Documenting Evidence Analysis.

Recommended Reading:

- Introduction to Information Technology – ITL Education Solutions Limited –Pearson Education
- Data Communications and Networking Tata McGraw Hill Edition B. A. Forouzan
- Rick Lehtinen and G.T. Gangemi, Computer Security Basics, O'Reilly Media, Inc.; 2nd edition, 2006
- Wall, David, (2007). Cybercrime: The Transformation of Crime in the Information Age. Polity Publishing
- Michael Cross, Scene of the Cyber Crime, Syngress Publishing, Elsevier Publishing, 2nd Edition, ISBN 13: 978-1-59749-276-8
- Chander, Harish, Cyber Laws and IT Protection, ISBN: 978-81-203-4570-6, PHI Learning

Learning outcomes: After studying this course, students will be aware of the precautions to be taken while doing online shopping / carrying out online transactions and this will also help them understand the cyber laws.

BFS CC 9: FEE AND FUND BASED FINANCIAL SERVICES

(4 CREDITS: 100 MARKS)

Objectives: To introduce students to fund& fee based financial services provided by financial companies, their salient features and importance, and their present position in the Indian financial sector.

UNIT 1: FACTORING & FORFEITING **(25 marks, 15 sessions**)

Factoring - Meaning, mechanism, types of factoring agreements; advantages and disadvantages of factoring; factoring v/s bill discounting; factoring in India, Forfaiting - meaning, mechanism; factoring v/s forfeiting.

UNIT 2: LEASE FINANCE & VENTURE CAPITAL FINANCE

(25 marks, 15sessions)

Lease Financing - Meaning, definition and types of lease agreements; advantages and disadvantages from the point of view of lessor and lessee; purchase v/s leasing, borrowing v/s leasing; lease finance in India .

Venture Capital Financing – Meaning, importance/need, scope of venture capital finance; venture capital v/s angel investors; Venture capital in India.

UNIT 3: MERCHANT BANKING **(20 marks, 10 sessions)**

Merchant Banking – Meaning, nature and functions; merchant banking in India, role in issue management; classification and regulation of merchant bankers by SEBI.

UNIT 4: DEPOSITORY SERVICES & UNDERWRITING SERVICES

(30 marks, 20 sessions)

Depository Services – meaning, role of depositories and their services, Advantages of depository system; Functioning of depository system; Depositories in India – NSDL & CSDL; Depository participants (DPs) and their role Custodial services - meaning; obligations and responsibilities of custodians; code of conduct.

Underwriting: Meaning , Registered Underwriters: Meaning, eligibility, regulation, rights, obligations; SEBI underwriters rules and regulations, Devolvement: Meaning, Rules; Consequences of Defaults; Underwriting commission; Types of Underwriting agreements; Agencies Underwriting in India.

Recommended Readings:

1. Agarwal O. P. (2005): Environment and Management of Financial Services, Mumbai, Himalaya Batra G. S. (1999): Financial Services: New Innovations, New Delhi, Deep & Deep
2. Bhole L. M. & Mahakud J. (2009): Financial Institutions and Markets: Structure, Growth & Innovations, New Delhi, Tata-McGraw Hill, 5e
3. Khan M. Y. (2004): Financial Services, New Delhi, Tata McGraw-Hill
4. Mantravadi P. (2001): Financial Services, Hyderabad, ICFAI
5. Pathak B. V. (2008): Indian Financial System, New Delhi, Pearson, 2

Learning outcomes: After studying this course students will get the broader idea of the fund based services and will also help to understand the investment avenues available.

BFS CC 10: DIRECT TAXES

(4 CREDITS: 100 MARKS)

Objectives : *To provide students with an understanding of the main provisions of the Income Tax Act, 1961, and keep them up to date on current developments in this area.*

UNIT 1: CONCEPTUAL FRAMEWORK AND EXEMPTIONS

(20 marks, 10 sessions)

Conceptual Framework – Income, Agricultural Income, Residential status and incidence of tax; casual income.

Definitions: (1) Sec.2 (1A) Agricultural Income, (2) Sec.2 (2) Annual Value, (3) Sec.2 (7) Assessee, (4) Sec.2 (8) Assessment, (5) Sec.2 (9)

Assessment year, (6) Sec.2 (14) Capital Asset, (7) Sec.2 (13) Business (8) Sec. 2 (17) Company, (9) Sec. 2 (24) Income, (10) Sec. 2 (31) Person (11) Sec. 2 (47) Transfer, (12) Sec. 80 (B) (5) Gross Total Income (13) Sec. 3 Previous year

Sec. 5-Scope of Total Income Sec. 5A – Apportionment of income between spouses governed by Portuguese Civil code: Sec. 5 – Residence in India.

UNIT 2: EXEMPTIONS AND EXCLUSIONS FROM INCOME: SEC. 10

(10 marks, 5 sessions)

Agricultural Income Sec.10 (1); Income of HUF. Sec. 10 (2);Share in total income of the Firm Sec. 10 (2A);Travel Concessions from Employer Sec. 10 (9) ;Gratuity Sec.10 (10) ;Compensation received at the time of voluntary retirement Sec.10 (10C) ;Amount received under Life Insurance Policy Sec.10 (10D) ;Payment received from Provident Fund Sec. 10 (11) ;Payment received from an approved Superannuation Fund Sec10 (13) ;House Rent Allowances Sec. 10 (13A) ;Special Allowances for expenses Sec. 10 (14) ;Income by way of interest, premium etc., from securities issued by the Central Government, etc., Sec. 10 (15) (13) Educational Scholarships Sec. 10 (21) ;Income of a Scientific Research Association, Sec. 10 (21) ;Income arising from transfer of units of Unit Scheme 1964 Sec. 10 (33) ;Income by way of Dividend Sec. 10 (34);Income from Mutual Funds Sec.10 (35)

UNIT 3: COMPUTATION OF INCOME

(25 marks, 15 sessions)

Incomes from Salaries; Income from House Property Sec. 22, 23, 24, 25, 25(AA), 25(B), 26 & 27; Profits and gains of Business or profession Sec. 28, 29, 30, 31, 32 (Excluding Depreciation Rates) ;Sec. 35 Expenditure on Scientific Research 35 A
Expenditure on Patents & Copyrights 35 D – Amortization of certain Preliminary Expenses ;Sec. 36 Main Clauses (Excluding Sub-Sub clauses) ;Sec. 37(1), (2), (2A), (2B), (3) ;Sec. 40, 40A, 40A(3) ;Sec. 43 (B) Sec. 44(AB), 44(AD), 44(AE), 44(AF)

UNIT 4: COMPUTATION OF INCOME **(45 marks, 30 sessions)**

A. Income from Capital gains and income from other sources; Deductions from gross total income
(1) Capital Gains: Sec. 45, 47, 48
(No practical problems on computation of capital gains).
(2) Income from other sources: Sec. 56, 57, 58
(Elementary problems on computation of income from other Sources)
(3) Deductions to be made in computing Total Income: Sec 80 C, Sec80 CCC, Sec 80CCD, Sec 80CCE, Sec. 80D, Sec. 80DD, Sec. 80E, 80G, Sec. 80U
(4) Deduction from gross total income in respect of any income by way of interest on savings account: 80TTA
B**.** Computation of Total Income: Computation of total income and tax payable of Individuals only

Recommended Readings:

- Gaur V. P. (1974): *Income Tax Law & Practice*, Ludhiana, Kalyani Publishing House
- Malhotra H. C.: *Income Tax Law and Practice*, Agra, Sahitya Bhawan
- Manoharan T.N.: *Students Handbook to Income Tax Law*, New Delhi, Snow White
- Narang G.: *Income Tax Law & Practice*, Ludhiana, Kalyani Publishing House
- Prasad B. (2001): *Income Tax Law & Practice*, New Delhi, Wishwa
- Singhania V. K. (2004): *Direct Taxes - Law and Practice*, New Delhi, Taxmann

Learning outcomes: After studying this course students will be ableto understand the Income Tax Act, 1961, and will be updated on current developments in this area.

BFS CC 11: INDIAN SECURITIES MARKET

(4 CREDITS: 100 MARKS)

Objectives: *To make students aware of the various components and sub-components of the Indian securities markets, the instruments traded in these markets, the participants and procedures; the students would also learn about the role of the regulator and recent developments in the area.*

UNIT 1: MONEY MARKETS (25 marks, 15 sessions)

Introduction – Meaning & Definition-Features of Money Market-Importance of Money Market-, Classification of Money Market Instruments – Call Money Market – Commercial Bills Market – Treasury Bill Market- Commercial Papers- Certificate of Deposits- Interbank Participation Certificate, REPO instruments, Merits & Demerits of each, Recent Developments in Money Market.

UNIT 2: PRIMARY MARKET (25 marks, 15 sessions)

Meaning & Definition – Functions - Advantages – Methods of Floating New Issues: Public Issue ,Offer for Sale ,Private Placement , Rights Issue –Principles Steps : Public Issue, Offer for Sale ,Private Placement – SEBI guidelines for IPO- Players in New Issue Market- Prospectus: Types, recent trends and reforms in Primary market

UNIT 3: SECONDARY MARKET (25 marks, 15 sessions)

Meaning, features, functions and players; Role of secondary market; Difference between secondary and primary market; Stock Exchanges: role of stock exchanges, demutualization of stocks; Products in secondary markets: equity and debt investment, Market indices and Types. Listing of Securities& Delisting of Securities; procedure, Merits & demerits and Types

UNIT 4: SEBI AND INVESTOR PROTECTION (25 marks, 15 sessions)

Objectives of SEBI, functions of SEBI, Powers of SEBI, SEBI's guidelines: Primary market-secondary market, Debentures, Underwriters, FII;SCCS system of SEBI and its mechanism, Investor protection measures of SEBIReforms in Indian securities market; Investor Protection Fund

Recommended Readings:

- V.A. Avadhani: Financial Services in India, Himalaya
- Gordon & Natarajan: Financial Markets and Services, Himalaya
- Avadhani V. A. (1998): Investment and Securities Market in India, Mumbai, Himalaya
- Bal Krishan &Narta S. S. (1997): Security Markets in India, New Delhi,
- Kanishka Bhole L. M. &Mahakud J. (2009): Financial Institutions and Markets: Structure,Growth& Innovations, New Delhi, Tata-McGraw Hill, 3e

Learning outcomes: After studying this course students will understand the basics of stock market and the role of SEBI as the regulator of stock markets in India.

BFS SEC 1:PRINCIPLES & PRACTICE OF INSURANCE

SKILL ENHANCEMENT COURSE

(4 CREDITS: 100 MARKS)

Objective: *The course provides basic understanding about the fundamentals of insurance & risk management along with the prime components of Indian insurance industry.*

UNIT 1: FUNDAMENTALS OF INSURANCE (20 marks, 10 sessions)

Introduction – Meaning, Definition, Features, Need & Importance of Insurance; Insurance Contracts – Terminologies, Elements of a Valid Contract & Characteristics of Life Insurance Products; Indian Insurance Market – Nationalization, Privatization, Players in Life & Non-Life Insurance, Opportunities, Challenges & Recent Trends.

UNIT 2: RISK MANAGEMENT AND INSURANCE (20 marks, 10 sessions)

Risks – Meaning& Classification; Perils & Hazards – Meaning & Types; Insurable Risks – Features & Requirements; Underwriting of Risks; Risk Management – Meaning & Stages.

UNIT 3: INSURANCE PRODUCTS (35 marks, 28 sessions)

Life Insurance – Term Insurance, Whole Life Insurance, Endowment Policy, Children's Policies, Annuities, Group Insurance & Industrial Life Assurance; General Insurance – Property Insurance (Fire Insurance, Engineering Insurance, Contractors All Risk Insurance, Marine Cargo Insurance, Motor Insurance, Burglary Insurance & Money Insurance), Personal Insurance (Mediclaim Policies & Personal Accident Insurance) & Liability Insurance (Employers Liability Insurance, Public Liability Insurance, Professional Indemnity Insurance & Product Liability Insurance).

UNIT 4: INSURANCE REGULATIONS & INTERMEDIARIES (25 marks, 12sessions)

Insurance Act, 1938; Duties, Powers & Functions of IRDA; Insurance Advertisements & Disclosure Regulations, 2000; Protection of Policy holders Interest Regulations, 2002; Third Party Administrators (Health Insurance) – Code of Conduct; Insurance Agents – Types & Code of Conduct; Insurance Brokers – Types & Functions.

Recommended Readings:

- Gulati, Neelam, Principles of Risk Management & Insurance, Excel Books.
- Misra, M.N. and Mishra, S.B., Insurance Principles & Practices, S. Chand Publication.
- Gupta P. K., Essentials of Insurance & Risk Management, Himalaya Publishing House.
- NSE NCFM Insurance Module.
- IRDA Handbook on Insurance.

Learning Outcomes: *The students will be equipped with the knowledge about fundamentals of insurance & develop an understanding about risk management in insurance business & various insurance products along with the regulatory framework & important intermediaries.* ***The students will be prepared to answer IRDA online insurance examination for obtaining license to practice in the insurance industry.***

BFS GEC 5: FINANCIAL MANAGEMENT

GENERAL ELECTIVE COURSE

(4 CREDITS: 100 MARKS)

***Objective**: To acquaint the students with financial management tools and techniques in financial decision making.*

UNIT 1: FINANCIAL MANAGEMENT **(20 marks, 5 sessions)**

Meaning, Nature and Scope of Finance; Financial Goals: Profit Maximization, Wealth Maximization; Finance Functions, - Investment, Financing and Dividend Decisions, Organization of Finance Function: Role of Finance Manager. Financial Mathematics: Concept & Relevance of Time Value of Money, Compounding Technique, Discounting Technique.

UNIT 2: INVESTMENT DECISION **(30 marks, 20 sessions)**

Nature and Significance of Investment Decisions, Process; Project Classification; Investment Evaluation Criteria; Non-Discounting Criteria: Pay-Back, Accounting Rate of Return (Traditional Method); Discounting Criteria: Internal Rate of Return, Net Present Value, Profitability Index, NPV and IRR Comparison, Capital Rationing; Risk Analysis in Capital Budgeting.

UNIT 3: COST OF CAPITAL AND CAPITAL STRUCTURE DECISIONS

(30 marks, 20 sessions)

Cost of Capital: Meaning and Significance of Cost of Capital: Calculation of Cost of Debt, Preference Capital, Equity Capital and Retained Earnings; Combined Cost of Capital (Weighted); Cost of Equity and CAPM; Financial and Operating Leverages; Capital Structure Theories-NI, NOI, Traditional and M-M Theories; Capitalization-Under Capitalization and Over Capitalization-Trading on Equity.

UNIT 4: WORKING CAPITAL AND DIVIDEND DECISION

(20 marks, 15 sessions)

Meaning, Need, Determinants; Estimation of Working Capital Need; Management of Cash; Inventory & Receivables; Factors Determining Dividend, Form of Dividends, Determinants of Dividend Models-Walter, Gordon & M.M. Models.

Recommended Readings:

- Pandey, I.M. financial Management, Vikas Publishing House, New Delhi.
- Khan M.Y. and Jain P.K. Financial Management, Tata McGraw Hill, New Delhi.
- Keown, Arthu J., Martin, John D., Petty, J. William and Scott, David F, Financial Management. Pearson Education.
- Chandra, Prasanna; Financial Management TMH, New Delhi.

Learning outcomes: *After studying this course students will be able to take proper investment decisions and select the most viable and profitable project.*

BFS GEC 6: STRATEGIC MANAGEMENT

GENERAL ELECTIVE COURSE

(4 CREDITS: 100 MARKS)

Objectives: *To enable students to understand the importance of strategic management decisions; to help them develop a holistic perspective of an organization; to enable students analyze the various strategic situations facing the organization and apply the concepts learned in the classroom to real-life events.*

UNIT 1: INTRODUCTION (15 marks, 10 sessions)

Strategy – Meaning & Definition; Elements of Strategy – Mission, Vision, Objectives, Goals, Targets &Key Performance Indicators, CC Competencies & Market Opportunities, Effective Execution; Mintzberg's Ten Schools of Thought for Strategy Formulation; Strategic Management – Meaning, Definition, Evolution, Characteristics, Merits, Limitations& Process.

UNIT 2: ENVIRONMENTAL SCANNING (35 marks,20 sessions)

Environmental Scanning – Meaning, Process, Importance&Strategies – Environmental Threat & Opportunity Profile (ETOP), PEST Analysis; Portfolio Strategy– BCG Matrix, GE Nine Cell Matrix, SWOT Analysis, TOWS Matrix, SPACE Matrix; Competitive Strategy – Competitor Analysis, Porter's Five Force Model; McKinsey's 7S Framework.

UNIT 3: CORPORATE STRATEGIES & STRATEGIC CHANGE

(35 marks, 20 sessions)

Corporate Strategies – Meaning; Porter's Generic Strategies– Low Cost, Differentiation, Focus; Growth strategies – Intensive Growth, Integrated Growth, Diversification Growth; Retrenchment Strategies – Turnaround Strategy, Captive Company Strategy, Transformation Strategy, Divestment Strategy, Liquidation Strategy; Combination Strategy.

Strategic Change – Meaning, Types of Change, Barriers to Change, Implementation of Strategic Change (Steps).

UNIT 4: GLOBALIZATION (15 marks, 10 sessions)

Globalization – Meaning, Factors Favouring Globalization, Obstacles to Globalization, Merits of Globalization; Globalization Strategies – Exporting, Foreign Investment, Mergers & Acquisitions, Joint Ventures, Strategic Alliance, Licensing & Franchising.

Recommended Readings:

- Cherunilam F.: Strategic Management, Himalaya.
- Gupta V., Gollakota K. & Srinivasan R. (2005): Business Policy & Strategic Management – Concepts & Application, Prentice-Hall.
- Lomash S. & Mishra P. K. (2005): Business Policy & Strategic Management, Vikas.
- Subba Rao P.: Business Policy & Strategic Management.

Learning Outcomes: After studying this course students will be able analyze the various strategic situations facing the organization.

BFS GEC 7: FUNDAMENTALS OF MARKETING

GENERAL ELECTIVE COURSE

(4 CREDIT: 100 MARKS)

OBJECTIVE: *To introduce students to the concepts of marketing and help them understand the application of the conceptual marketing frameworks.*

UNIT 1: INTRODUCTION **(25 marks, 15 sessions)**

Introduction to marketing concept, its relevance in India, marketing mix, marketing structures and systems. Environmental scanning and market opportunity analysis. Buyer Behaviour - household and institutional/organisational. Market segment and segmental analysis. Market estimation - Market potential, demand forecasting and sales forecasting.

UNIT 2: MARKETING RESEARCH **(30 marks, 20 sessions)**

Marketing Information Systems, Marketing Research, Market Planning. Product mix decisions - product identification, product life cycle, branding and packaging. New product development and management.

UNIT 3: PRICING POLICIES **(25 marks, 15 sessions)**

Pricing policies, structures and methods. Concepts of regulated prices in selected industries. Promotion decision - Communication process, promotion mix, promotion strategies with reference to consumer and industrial products. Advertising and personnel selling decision.

UNIT 4: DISTRIBUTION MANAGEMENT **(20 marks, 10 sessions)**

Distribution Management - importance of distribution in developing country. Role of middle man, identification, selection and managing dealers. Distribution Channels Management - Physical distribution. Performance and control - Marketing Audit. Case Studies and Presentations .

Recommended readings:

- Marketing Management - Kotler, Keller, Koshy & Jha – 14th edition,
- Basic Marketing,13th edition, Perrault and McCarthy
- Marketing management – Indian context Dr.Rajan Saxena
- Marketing Management – Ramaswamy & Namkumari
- R. L. Varshuey & S.L.Gupta: Marketing Management An Indian Perspective (Sultan Chand)

Learning outcomes: After studying this course students will be able to analyse the target market through market research and will also be in the position to do the pricing of the product.

BFS CC 12: STOCK MARKET OPERATIONS

(4 CREDITS: 100 MARKS)

Objective: *To introduce the student to the practical aspects of the functioning of stock exchanges in India.*

UNIT 1: INTRODUCTION TO STOCK MARKET (25 marks, 15 sessions)

Nature of stock market, growth, role and functions of stock market; Membership, ownership and management of Stock Exchanges; Overview of major stock exchanges in India- BSE, NSE, OTCEI and Regional stock exchanges; - Introduction; major indices – SENSEX, NIFTY, sectoral indices; ; Markets in US, UK, Europe & Asia; important indices – Dow Jones, NASDAQ, S&P, FTSE, Nikkei, Shanghai, Hang Sang & any other.

UNIT 2: TRADING MEMBERSHIP (30 marks, 15 sessions)

Stock Brokers; NSE Membership; eligibility, procedure of new membership, Upgradation and transfer of membership, surrender of trading membership; Suspension & Expulsion of Membership; broker-clients relations: Client Registration Documents, Margins from the Clients, Execution of Orders, Contract Note, Payments/Delivery of Securities to the Clients, Brokerage, Segregation of Bank Accounts, Segregation of Demat (Beneficiary) Accounts.
Sub-Brokers: Eligibility,registration, cancellation; Sub Broker Client relations ; relations with client, securities funds, sub brokerage

UNIT 3: TRADING & SETTLEMENT MECHANISMS (25 marks, 15 sessions)

NSE: Transaction cycle and Settlement process, settlement agencies NEAT, Order & Trade Management, Trading rules, circuit filters, Pay In & Pay Outs, No delivery period.
BSE: Trading systems, Share groups on BSE, Settlement systems, BOLT, Types of Delivery - Bad and Short Deliveries, Auctions.

UNIT 4: RISK MANAGEMENT SYSTEMS (20 marks, 15 sessions)

Capital Adequacy Requirements, Trading & Exposure Limits, Margin requirements, Settlements Guarantee,online and offline exposure monitoring Gross Margining, Indemnity & Insurance, Investigation & Inspection, investor protection fund.

Recommended Readings:

- Pandey I. M. (1995): *Essentials of Financial Management*, New Delhi, Vikas
- Avadhani V. A. (1998): *Investment & Securities Market in India,* Mumbai, Himalaya
- Agarwal S.: *A Guide to the Indian Capital Market*, Bharat
- Websites of NSE, BSE, SEBI & NASDAQ

Learning outcomes: After studying this course students will be familiar with the terminology and practices on major Indian stock exchanges, and recent developments in the area.

BFS CC 13: CORPORATE FINANCE

(4 CREDITS: 100 MARKS)

Objectives: *To introduce the student to various financial aspects of the functioning of corporations, the valuation of different sources of finance and to make students aware of the rationale, procedure and implications of mergers and acquisition*

UNIT 1: INTRODUCTION TO VALUATION **(20 marks, 10 sessions)**

Time value of money; Simple and compound interest rates; Continuous compounding; Real and nominal interest rates; Types of loans; Loan amortization

UNIT 2: STOCK VALUATION **(30 marks, 20 sessions)**

Stock returns, Anticipated returns, Present value of returns, Multiple year holding period, Constant growth model, Two stage growth model, Valuation through P/E

UNIT 3: BOND VALUATION **(30 marks, 20 sessions)**

Meaning, bond risk, types of bonds, Present value

Bond returns: - Holding period returns-Current yield-Yield to maturity-Term structure of interest rates-Macaulay's Duration Effects of interest rates and inflation on bonds.

UNIT 4: STOCK DIVIDENDS, STOCK REPURCHASES AND STOCK SPLITS

(20 marks, 10 sessions)

Meaning, Type, Provision in India; Dividend stability; Cash dividend v/s Repurchases; Factors affecting stock dividend; Stock repurchases and stock splits; Reverse split

Recommended Readings:

- Damodaran A (1994) : Damodaran on Valuations, New Delhi, John Wiley
- I.M Pandey (2005): Financial management,
- Pike R (1998): Corporate Finance & Investments : Decisions & strategies, New Delhi, Prentice- Hall of India

Learning outcomes: After studying this course students will be able to calculate returns on the securities.

BFS CC 14: ENTREPRENEURSHIP DEVELOPMENT

(4 CREDITS: 100 MARKS)

Objective: *To provide students with substantial knowledge about the requirements of setting up a firm and exercising entrepreneurship skills.*

UNIT 1 – INTRODUCTION **(25 marks, 15 sessions)**

Entrepreneur - Meaning, Definition, Characteristics, Qualities, Skills, Functions, Types; Intrapreneur - Meaning, Definition, Features, Qualities; Entrepreneurship Development - Evolution in India, Stages In Entrepreneurship Development, Factors Affecting Entrepreneurship Development and Conditions for Successful Growth of Entrepreneurship

UNIT 2 - IDENTIFICATION OF BUSINESS OPPORTUNITIES **(20 marks, 12sessions)**

Stage 1 - Who Am I - SWOC Analysis, Identification of Business Opportunities, Steps in Business Opportunity.

Stage 2 - Study of Local Market - What Is Market Survey, Need for Market Survey, Techniques of Market Survey

Stage 3 - Selection Stage - Project Identification, Sources of Ideas, Idea Processing and Selection.

UNIT 3 - MARKET RESEARCH & PROJECT REPORT: **(25 marks, 15 sessions)**

Classification of Market, Meaning of Market Research, Sources of Market Research, Importance of Market Research, and Procedure followed to undertake a market research

Project Report: Meaning**,** Content**,** significance

UNIT 4 – INTRODUCTION TO MANAGERIAL SKILLS

(30 marks, 18 sessions)

Human Resource Management: Meaning, Role, Importance. Financial Management: Meaning, Scope, Decisions, Role of Financial Manager, Goal of Financial Management.

Marketing management: Meaning, Functions, Marketing Mix, strategies, branding, trade mark, advertising. Purposeful Innovation-Meaning.

Recommended readings:

- Bhattacharya S.N- Entrepreneurship Development in India & the South East countries – Metropolitan Book Comp.
- Desai Arvind – Environment & Entrepreneurship – New Delhi, Ashish Publishing House - New Delhi 3. Dr. Deshpande Manohar – Entrepreneurship of Small Scale Industries – Deep & Deep Publication, New Delhi
- Drucker Peter – Innovation & Entrepreneurship Affiliated East-West Press Pvt. Ltd.,- New Delhi

Learning outcomes: After studying this course students will be aware of the various schemes available for self employment and will be motivated to take up entrepreneurship.

BFS SEC 2: FINANCIAL STATEMENT ANALYSIS

SKILL ENHANCEMENT COURSE

(4 CREDITS: 100 MARKS)

Objectives: To help students develop knowledge and understanding of financial statement analysis; different tools and techniques of financial analysis and its practical application in the published financial reports of the companies.

UNIT 1: FINANCIAL STATEMENT ANALYSIS (40 marks, 25 sessions)

Financial statements- Meaning Components and its needs, Financial statements Analysis - Meaning,advantages and disadvantages, parties interested in FSA, and Tools for FSA (Practical Problems on Comparative, Common size and Trend Analysis both Income statement and Balance Sheet along with interpretation).Value Added statement – Meaning and Preparation of Value Added Statement.

UNIT 2: RATIO ANALYSIS (30 marks, 20 sessions)

Ratio Analysis- Meaning and Functional Classification of ratios. (Profitability, Liquidity, Leverage, Turnover, Market Strength Analysis and Coverage), Calculation and Interpretation of Ratios from Balance Sheet and Income Statement.

UNIT 3: CONTENTS OF CORPORATE ANNUAL REPORTS

(20 marks, 10 sessions)

Understanding the Contents of Corporate Annual Reports- Letter to Shareholders, Business Description, Report on Internal Control,Directors Report; Management Discussion; Balance Sheet; Cash flow Statement; Significant Accounting Policies; Notes to Accounts, ; Auditors Report.

UNIT 4: CORPORATE GOVERNANCE (10 marks, 05 sessions)

Corporate Governance- Meaning, objectives, Needs, Principles and elements on corporate governance with reference to Board of directors, Audit committee, Disclosure and Compliance.

Recommended Readings:

- Rao M.: Financial Statement Analysis and Reporting, PHI Learning Pvt ltd
- Mukherjee A. & M. Hanif: Corporate Accounting, Tata McGraw Hill.
- Maheshwari S.N & S.K. Maheshwari: Corporate Accounting, Vikas Publication
- Shah P.: Basic Financial Accounting for Management, Oxford University Press

Learning outcomes: After studying this course students will be able to do practical application in the published financial reports of the companies.

BFS GEC 8: COST AND MANAGEMENT ACCOUNTING

GENERIC ELECTIVE COURSE

(4 CREDITS: 100 MARKS)

Objectives: *To provide basic conceptual and working knowledge of the various tools and techniques of management accounting, which assists the management of an organisation in its major functions, viz. Planning, decision making and control*

UNIT 1: ELEMENTS OF COSTING **(20 marks, 10 sessions)**

MeaningDefinition, objectives, advantages and disadvantages of cost accounting; Distinction between cost accounting and financial accounting; Classification of cost (element wise in detail); Preparation of cost sheet.

UNIT 2: PROCESS AND CONTRACT COSTING **(30 marks, 20 sessions)**

Meaning, advantages and applicability of process costing and contract costing, Process Costing: Excluding equivalent production, joint product, by product but inclusive of inter-process profits; Contract account for one year with Balance Sheet.

UNIT 3: BUDGETING **(30 marks, 20 sessions)**

Budgeting meaning and needs, Classification of Budgets, Preparation of Functional budgets - Sales, Production cash budget, Flexible budget and Master budget. (Practical problems to be based on cash budget, flexible budget, Sales budget and Production budget) and Zero base budgeting, Applications of marginal and differential costing as a tool for decision making – make or buy decision, Break-even analysis, shut down decision.

UNIT 4: MANAGEMENT ACCOUNTING & STANDARD COSTING

(20 marks, 10 sessions)

Meaning, definition, function, objectives, advantages, distinction between management accounting, financial accounting and cost accounting, tools of the management accountant

Standard costing and variance analysis, meaning, definition, advantages, types of variances, material cost variance, labour cost variance, overhead cost variance. Interpretation of variances: interrelationship, significance.

Recommended Readings:

- S.P. Jain and K.L. Narang Cost Accounting Principles and Practice- Kalyani Publishers, Ludhiana.
- B.K. Bhar – Cost Accounting
- Ravi M. Kishore – Cost Accounting
- S.N. Maheshwari, Management Accounting & Financial Control Sultan Chand & Sons

Learning outcomes: After studying this course students will be able to prepare budgets and understand the techniques of management accounting.

BFS GEC 9: CORPORATE RESTRUCTURING

GENERIC ELECTIVE COURSE

(4 CREDITS: 100 MARKS)

Objectives:*To introduce students to the concepts of mergers, acquisitions, takeovers & other related concepts & to enable them to understand the process as well as appreciate the benefits & drawbacks of all forms of corporate restructuring.*

UNIT 1: INTRODUCTION **(35 marks, 20 sessions)**

Meaning, Objectives, Characteristics, Needs &Purposes of Corporate Restructuring; Forms &Components of Corporate Restructuring; Limitations of Corporate Restructuring; Global & Indian Scenario of Corporate Restructuring; Maximization of Organizational Value: Strategy Formulation – Steps & Methods; Strategic Approaches to Corporate Restructuring – SWOT Analysis, BCG Growth Share Matrix, Porter's Five Forces Model & Porter's Generic Strategies.

UNIT 2: MERGERS & ACQUISITIONS **(35 marks, 20 sessions)**

Meaning, Definition & Types of Mergers; Motives behind Mergers; Merits of M & A; Merger Waves: US & Indian Experience; Theories of Mergers; Steps in Merger Process; Methods of Valuing a Company; Financial Synergies in M & A; Impact of M & A on Stakeholders; Reasons for Failures of M & A.

UNIT 3: TAKEOVERS **(15 marks, 10 sessions)**

Meaning & Types of Takeovers; Motives behind Takeovers; Takeover Code in India; Economic Aspects of Takeovers; Considerations for Takeovers; Financing Takeovers; Takeover Defences; Takeover Bids.

UNIT 4: FUNDING OF MERGERS & TAKEOVERS **(15 marks, 10 sessions)**

Selection of Financial Alternatives; Process of Funding; Funding through various Types of Financial Instruments – Equity Shares, Preference Shares, Private Placement, Buy Back of Shares, Employee Stock Ownership Plan, External Commercial Borrowings, Foreign Currency Convertible Bonds, Foreign Currency Exchangeable Bonds, Management Buyouts; Funding through Financial Institutions & Banks, Rehabilitation finance, Leveraged Buyouts.

Recommended Readings:

- Bhagaban Das, Debdas Rskhit & Sathya Swaroop Debashish: Corporate Restructuring: Mergers, Acquisitions and Other Forms, Himalaya.
- Weston, Chung & Hoag, Mergers: Restructuring and Corporate Control, PHI.
- S. ShivaRamu , Corporate Growth through Mergers & Acquisitions , Sage.
- John Humphrey, Kaplinsky & Saraph , Corporate Restructuring , Sage.
- Sudarshan: The Essence of Mergers & Acquisitions, PHI.
- Weston: Takeovers , Restructuring & Corporate Governance , PHI.

Learning Outcomes: After studying this course students will understand the process as well as appreciate the benefits & drawbacks of all forms of corporate restructuring.

BFS GEC 10: ORGANIZATIONAL BEHAVIOUR

GENERIC ELECTIVE COURSE

(4 CREDITS: 100 MARKS)

Objectives: *To familiarize the students with the concepts and theories underlying individual and group behaviour in organizational context, so as to help in understanding the reciprocal relationship between the organizational characteristics and managerial behaviour.*

UNIT 1: ORGANISATIONAL BEHAVIOUR (25 marks, 15 sessions)

What are Organisations? – Why do Organisations Exist? – Nature of Organisational Behaviour – Foundations of OB – Why Study OB? – Shortcomings – Organisational Arrangement for OB – Contemporary OB – Scope of Organisational Behaviour.

UNIT 2: GROUP DYNAMICS (25 marks, 15 sessions)

Nature of Groups – Types of Groups – Why do People Join Groups? – Group Development – Usefulness of Groups in Organisations – Pitfalls of Groups – Determinants of Group Behaviour – Group Structuring – Group Decision Making – Groups and OB.

UNIT 3: WORK STRESS (25 marks, 15 sessions)

Meaning and Definition – The Stress Experience – Work Stress Model – Burnout – Stress Management – Stress and Performance.

UNIT 4: ORGANISATIONAL BEHAVIOUR – The Emerging Challenges

(25 marks, 15 sessions)

Managing Diversity – Career Management – Talent Management – Changing Demographics of Work Force – Changed Employee Expectations – Globalisation – Technology Transformation – Promoting Ethical Behaviour and CSR – Organisational Justice.

Recommended Readings:

- K. Aswathappa —Organisational Behaviour‖ Himalaya Publishing House
- Rosemary Thomson & Christopher Mabey – Developing Human Resources

- Gregory Moorhead & Richy W. Griffin – Organisational Behaviour
- I.M. Prasad – Organisational Behaviour

Learning outcomes: After studying this course students will be able to understand the group dynamics and emerging challenges in organisational behaviour.

BFS CC 15: SECURITY ANALYSIS AND PORTFOLIO MANAGEMENT

(4 CREDITS: 100 MARKS)

Objective: *To introduce the student to the process of investment and associated considerations; to make the student aware of the theoretical basis of management of investment portfolios; to help the student learn how to analyze portfolios; to make the student aware of emerging issues in the area of investment and portfolio management*

UNIT 1: INTRODUCTION **(10 marks, 5 sessions)**

Meaning and scope of Investments; Investment Process, Objectives; Investment Planning, Variables in Investment Decisions, Investment Avenues; Investment versus Speculation

UNIT 2: ANALYSIS OF PORTFOLIO **(35 marks, 20 sessions)**

A. Fundamental Analysis – (a) Economic Analysis (b) Industry Analysis (c) Company Analysis; Technical Analysis – use of charts, types

B. Emerging Issues in SAPM**:** Blue Chips; Non-Resident Indian Investment; Foreign Institutional Investors

UNIT 3: RISK-RETURN ANALYSIS **(25 marks, 15 sessions)**

Meaning of Risk-Return; types of risks; measurement of risk; Beta Analysis; Markowitz two security analysis; Portfolio construction

UNIT 4: PORTFOLIO MANAGEMENT: MEANING & APPROACH

(30 marks, 20 sessions)

Meaning, Portfolio Theory, Objectives, Efficient Portfolio, Review and Revision of Portfolio; Risk-Return Analysis; Portfolio Models – Efficient Market Hypothesis, Random Walk Theory, Dow Theory, CAPM

Recommended Readings:

- Avadhani V. A. (1997): *Investment Analysis and Portfolio Management*, Mumbai, Himalaya Bodie Z. & Kane A. (1995): *Essentials of Investment*, London
- Irwin Chandra P. (2002): *Investment Analysis and Portfolio Management*, New Delhi, Tata McGraw-Hill
- Fischer D. E. & Jordan R. J. (1995): *Security Analysis and Portfolio Management,* New Delhi, Prentice-Hall of India Strong
- R. A. (2001): *Portfolio Management Handbook*, Mumbai, Jaico
- Punithavathy Pandian: Security analysis and portfolio management

Learning outcomes: After studying this courseit will help the student learn how to analyze portfolios and also create awareness of emerging issues in the area of investment and portfolio management.

BFS CC 16: INTERNATIONAL FINANCE AND FOREIGN EXCHANGE MARKET

(4 CREDITS: 100 MARKS)

Objectives: *To acquaint students with the methods and procedures involved in the financing of international trade and to introduce students to international finance and financial instruments; to familiarise students with emerging trends in foreign investment.*

UNIT 1: INTERNATIONAL MONETARY SYSTEM (20 marks, 10 sessions)

International monetary system – need, evolution; Bretton Woods system; International Monetary Fund and the World Bank; European Monetary Union and the euro; regional financial institutions

UNIT 2: INTERNATIONAL FINANCIAL MARKETS (25 marks, 15 sessions)

International Money and Capital markets; growth and current status of international financial markets, International bond markets; Euro Currency markets; Euro Issues, ADRs, GDRs, Various International Debt instruments.

UNIT 3: FOREIGN INVESTMENT & FOREIGN EXCHANGE MARKET

(30 marks, 10 sessions)

Foreign Direct Investment- meaning; determinants of FDI; Foreign Portfolio Investment – meaning; Determinants of FPI.Meaning of foreign exchange; features and functions of the forex market, participants, various types of forex transactions; wholesale and retail markets; Indian forex market .Exchange rate systems - fixed, floating and managed floating; factors influencing exchange rates

UNIT 4: BALANCE OF PAYMENTS (25 Marks, 20 session)

Meaning and Structure of Balance of Payments; concepts of Balance and Equilibrium; Disequilibrium –meaning, types, causes; measures to correct deficits in the BoP –automatic and discretionary, monetary and non-monetary measures

Recommended Readings:

- O.P. Agarwal, B.K. Chaudhuri (2015): foreign trade & Foreign Exchange, Himalaya publishing House, Mumbai
- Andley K. K. & Mattoo V. J. (1996): Foreign Exchange: Principles and Practice, New Delhi, Sultan Chand & Sons, 8eAvadhani V. A. (2004): International Finance, Mumbai, Himalaya Carbaugh R. J. (1994): International Economics, Cincinnati, South-Western College
- Macmillan Jeevanandam C. (2002): Foreign Exchange: Practice, Concepts and Control, New Delhi,
- Sultan Chand & Sons Keshkamat V. V. (1985): Foreign Exchange: An Introduction,
- Avadhani V.A. (2004) International Finance, Mumbai, Himalaya

Learning outcomes: After studying this course students will be aware of the procedures involved in the financing of international trade and various types of foreign exchange transactions

BFS DSEC 1: E-COMMERCE AND E-ACCOUNTING

DISCIPLINE SPECIFIC ELECTIVE COURSE

(4 CREDITS: 100 MARKS)

Objectives: *To develop an understanding of web based Commerce, equip students to assess E-Commerce requirements of a business and develop e-business plans.*

UNIT 1: INTRODUCTION TO E-COMMERCE (30 marks, 15 sessions)

E-Commerce and E-Business, Categories of E-Commerce, Growth & Development of E-Commerce, Business Models and Revenue Models, Business Processes and E-Commerce, Economic Forces & E-Commerce, Identifying E-Commerce Opportunities, International Nature of E-Commerce.

UNIT 2: E-MARKETING AND E-PAYMENT SYSTEMS (30 marks, 20 sessions)

E-Marketing, Creating, Hosting and Designing a Website, Web Marketing Strategies, Market Segmentation on the Web, Advertising on the Web, Creating & Maintaining Brands on the Web, E-Payment Solutions – Basics of Online Payments, Payment Cards, E-Cash, E-Cheques, E-Wallets, Stored Value Cards, E-Banking & Mobile Commerce.

UNIT 3: E-CRM (CUSTOMER RELATIONSHIP MANAGEMENT) AND E-SCM (SUPPLY CHAIN MANAGEMENT): (30 marks, 15 sessions)

CRM vs E-CRM, Technologies in E-CRM, E-CRM Capabilities & Customer Life Cycle,
E-SCM using Internet technologies, Value Creation in Supply Chain, Using E-SCM for 'Real-time' Benefits.

UNIT 4: FUNDAMENTALS OF E-ACCOUNTING (10 marks, 10 sessions)

E-Accounting – Meaning & Features, E-Accounting Software – Tally, SAP, Oracle and Batchmaster, E-Accounting Adoption Model, Benefits & Costs of E-Accounting, Importance and Uses of E-Accounting, E-Accounting in India – Challenges & Prospects.

RECOMMENDED READINGS:

- E-Commerce Strategy, Technology & Applications, David Whiteley, Tata McGraw Hill Publishing Company Ltd.
- E-Commerce Strategy, Technology & Implementation, Gary P. Schneider, Cengage Learning India Pvt. Ltd.
- E-Commerce E-Business, Dr. C. S. Rayudu, Himalaya Publishing House.
- E-Commerce and its Applications, U. S. Pandey, Rahul Srivastava, Saurabh Shukla, S. Chand and Company Ltd.

Learning outcomes: After studying this course students will be able to assess e-commerce requirements of a business and develop e-business plans

BFS DSEC 2: MARKETING OF FINANCIAL SERVICES

DISCIPLINE SPECIFIC ELECTIVE COURSE

(4 CREDITS: 100 MARKS)

Objective: *To equip students with knowledge about strategy, mix and promotion of Financial Services.*

UNIT 1: CATEGORIES OF FINANCIAL PRODUCTS (25 marks, 15 sessions)

Insurance, Banks, Stocks, Mutual Funds, Pension plans, other savings products – The financial services marketing environment- The distinctive aspects of services marketing; micro and macro environmental forces; new developments and trends

UNIT 2: MARKETING STRATEGY (35 marks, 20 sessions)

Planning, organizing and implementing marketing operations; marketing as a management function, Market research-Establishing a marketing information system; the marketing research process, Market segmentation – Target marketing; market segmentation, targeting and positioning the financial services organization in the marketplace

UNIT 3: THE MARKETING MIX (25 marks, 15 sessions)

Product strategy; new product development; product life cycle, pricing considerations and strategies, Distribution channels; the impact of technology; on-line marketing; multiple channel strategies

UNIT 4: PROMOTION STRATEGIES (15 marks, 10 sessions)

A. advertising, sales promotion, public relations; sponsorship; the internet as a promotion tool, People in the marketing mix; personal selling and sales force management; the selling process, Physical evidence and processes customer care, The dimensions of customer care; service quality and service recovery; global marketing

B. Regulations Governing Financial Services Marketing: Ethical issues in the marketing of financial services, Ethics in relation to the individual and society as a whole

Recommended Readings:

- Marketing Financial services-Hooman Estelami.
- The Financial Services Handbook-Evelyn enrich & Duk Fanelli.
- Marketing Financial Services – Elsevier.
- Marketing of financial services-Gordon and Natrajan

Learning outcomes: After studying this course students will be expert in marketing of the financial services which is the CC business activity today.

BFS DSEC 3: MUTUAL FUNDS MANAGEMENT

DISCIPLINE SPECIFIC ELECTIVE COURSE

(4 CREDITS: 100 MARKS)

OBJECTIVE: *To help students gain an in-depth understanding of this growing component of the financial services sector.*

UNIT 1: INTRODUCTION **(20 marks, 10 sessions)**

Meaning of Mutual Fund, Structure in India, Custodians of Mutual Funds (Sponsors, Trust, AMC), Role of AMC, NFOs, Registrars, Agents, Mutual Fund Classification, Types of Mutual Funds. Objectives of AMFI, Advantages of Mutual Funds, Systematic Investment Plan (SIP), Systematic Transfer Plan (STP), Systematic Withdrawal Plan (SWP).

UNIT 2: MUTUAL FUND INDUSTRY **(15 marks, 10 sessions)**

History of Mutual fund Industry in India – Formation and organization – fund accounting and valuation – Portfolio management – Performance measurement and evaluation of mutual fund schemes – unit holder's protection.

UNIT 3:MUTUAL FUND PRODUCTS **(45 marks, 30 sessions)**

Mutual Fund Products and Features: Equity Funds: Definition, features of Equity funds, IndexFund, Large Cap Funds, Mid Cap Funds, Sectoral Funds, Types of Equity Schemes, Arbitragefunds, Multicap funds, Quant funds, P/E Ratio fund, International Equities Fund, GrowthSchemes.

Gold Exchange Trade Funds (ETFs): Introduction Features, Working of ETFs, Market Makingwith ETFs, Creation Units, Portfolio Deposit and Cash Component.

Debt Funds: Features, Interest Rate Risk, Credit Risk, Pricing of Debt Instruments, Debt Instrument Schemes, (Fixed Maturity Plans, Capital Protect Funds, Gilt Funds, Balanced Funds, MIPs, ChildBenefit Plans, Liquid Funds: Features, Floating Rate Scheme, Portfolio of Liquid funds.

UNIT 4: INVESTMENT ANDPERFORMANCEMEASUREMENT

(20 marks, 10 sessions)

Evaluation of Performance of Mutual Funds: fund performance, Measuring return, Measuring risk,Risk-adjusted return, Comparing fund performance with a reference, various standardizedperformance systems, Limitations of performance measurement and evaluation

Recommended Readings:

- Frank K.Reilly and Keith C.Brown, Investment Analysis &Portfolio Management,7/e Thomson Publications, 2006.
- William F. Sharpe, Gordon J.Alexander and Jeffery V.Bailey, Investments, 6th edition, Prentice Hall, 2006.
- Prasanna Chandra, Investment Analysis and Portfolio Management, 3/e Tata McGraw-Hill Publishing Co. Ltd. New Delhi, 2006.

Learning outcomes: After studying this course students will have detailed knowledge about the mutual fund industry.

BFS DSEC 4: DERIVATIVES: EQUITY AND CURRENCY

DISCIPLINE SPECIFIC ELECTIVE COURSE

(4 CREDITS: 100 MARKS)

Objective: *This subject is designed to provide a basic understanding about the Derivatives and Commodity Markets to the students.*

UNIT 1: INTRODUCTION TO DERIVATIVES (15 marks, 10 sessions)

Derivatives Defined; Products, Participants and Functions; Derivatives Markets; Spot versus Forward Transaction; Exchange Traded Versus OTC Derivatives; Some commonly used Derivatives; Difference between Commodity And Financial Derivatives; Physical Settlement; Warehousing; Quality of Underlying Assets

UNIT 2: INSTRUMENTS AVAILABLE FOR TRADING (25 marks, 15 sessions)

Forward Contracts; Futures Contracts; Distinction between Futures and Forward Contracts; Futures Terminology; Introduction to Options: Option Terminology - Basic Payoffs, Payoff for Buyer of Asset: Long Asset, Payoff for Seller of Asset: Short Asset; Payoff For Futures, Payoff for Buyer of Futures: Long Futures, Payoff for Seller of Futures: Short Futures; Payoff For Options - Payoff for Buyer of Call Options: Long Call, Payoff for Writer of Call Options: Short Call, Payoff for Buyer of Put Options: Long Put, Payoff for Writer of Put Options: Short Put

UNIT 3: COMMODITY DERIVATIVES (25 marks, 10 sessions)

Evolution of Commodity Exchanges; Commodity Exchange; Role of Commodity Exchanges; Commodity Derivative Markets in India; Indian Commodity Exchanges; Global Commodity Derivatives Exchanges; Recent Developments

UNIT 4: TRADING, CLEARING AND SETTLEMENT (35 marks, 25 sessions)

Trading - Futures Trading System; Entities in The Trading System; Commodity Futures Trading Cycle; Order Types And Trading Parameters; Permitted Lot Size; Tick size for contracts & Ticker symbol; Quantity Freeze; Base Price; Price Ranges of Contracts; Order Entry on the Trading System; Margins For Trading In Futures

Clearing - Clearing Mechanism; Clearing Banks; Depository participants

Settlement - Settlement Mechanism; Settlement Methods; Entities involved in Physical Settlement, Risk Management

Recommended Readings:

Pandey I. M. (1995): Essentials of Financial Management, New Delhi, Vikas

Avadhani V. A. (1998): Investment & Securities Market in India, Mumbai, Himalaya

Agarwal S.: A Guide to the Indian Capital Market, Bharat

Learning outcomes: After studying this course, the students will learn the difference between Commodity and Financial derivatives, the Instruments available for trading, Trading, Clearing & Settlement of Derivative Contracts and also the regulatory framework for Derivative market in India.

BFS CC 17: INTERNSHIP REPORT AND SEMINAR

(24 CREDITS: 600 MARKS)

Students will complete a 15-week internship, which will commence one week after the end of the Semester V examinations

Students will write a report on the internship completed by them.

The assessment of the internship and the report shall be as per the guidelines issued by Goa University

ANNEXURE – COURSES RECOMMEDNED

Programme: M. A. Economics

Course Code: Eco 130 **Title of the Course:** The Indian Economy

Number of Credits: 4 **Contact Hours: 48**

Effective from AY: 2020-2021

Prerequisites for the course:	Nil	
Objective:	This course is intended to provide students a comprehensive understanding of India's economic development in recent years and to familiarize students with the growth, development and contribution of various sectors to the Indian economy.	
Content:	**1. Economic Growth and Policy** Economic growth in the last two decades - changing structure of Indian economy and service sector led growth – New Economic Policy – Liberalisation, Privatisation, Globalisation – State Vs Market.	10 Hours
	2. Agricultural Development Green revolution, success and failures – Issues in agricultural development –finance, marketing, warehousing – Cropping pattern – cash crops and oil seeds- agricultural exports.	08 Hours
	3. Industrial Development India's industrial growth – New industrial policy – privatisation, disinvestment and exit policy, MSME - role in development, Research and Development, Technology and Industrial productivity, Emerging industries in India, SEZs.	10 Hours
	4. Unemployment, Inequality and Poverty Unemployment – measurements and trends, Regional inequality in growth and convergence, Poverty-Measurements and trends, issues in poverty measurements.	10 Hours
	5. Trade and Development Foreign trade of India – Structure and direction, New trade policy and exports, FDI and related issues, India's free trade agreements.	10 Hours

Pedagogy:	lectures/ case analysis/assignments/class room interaction	
References/Readings	• AcharyaSankar and Rakesh Mohan (2010), India's Economy: Performance and Challenges, Oxford University Press, New Delhi. • BalakrishnanPulapre (2010), Economic Growth in India: History and Prospect, Oxford University Press, New Delhi. • BasuKaushik (2004), India's emerging economy: performance and prospects in the 1990s and beyond, The MIT Press • BimalJalan (2004), The Indian Economy, Problems and Prospects, Penguin Books, New Delhi. • GhateChetan (Ed) (2012), The Oxford Handbook of the Indian Economy, Oxford University Press, New Delhi. • Hansen A. And Sanjay Kathuria (2001), India: A financial Sector for the twenty first century, Oxford University Press, New Delhi. • MahendraDev (2010), Inclusive Growth in India: agriculture, poverty and human development, Oxford University Press, New Delhi. • NayakPulin B, ViswanathGoldar and PradeepAgarwal (2010), India's Economy and Growth, Sage Publications, New Delhi. • Panagariya, Arvind (2010), India the emerging Giant, Oxford University Press, New Delhi • Sudhakara Reddy B (2009), Economic Reforms in India and China: Emerging Issues and Challenges, Sage Publications, New Delhi. • Economic Survey, Government of India, Ministry of Finance, New Delhi (various issues) • Reserve Bank of India, Monetary policy report, (Annual, Various Issues)	
Learning Outcomes	1. This course will enable the students to understand the landscape of Indian economy and acquaint themselves with the latest data and trends 2. The students will be able to understand the overall sectoral development in Indian economy.	

Programme: M. A. Economics

Course Code: Eco 131

Title of the Course: Introduction to Spatial Economics

Number of Credits: 4

Effective from AY: 2020-21

Prerequisites for the course:	Basic knowledge of development studies and familiarity with use of spreadsheets.	
Objective:	To introduce the Spatial economic analysis to the students to make them understand the development and growth process. To expose the students to the tools integrating GIS (Geographic Information System) and Remote sensing to analyse the economic change.	
Content:	**1. Introduction** Key Concepts in Spatial analysis, Geographic Information System- remote sensing, Multiscale analysis, Data models and scales of measurement- Raster imagery and Vector Data – Meaning and its objects- Base model- Scale of measurement, Spatial variation. **2. Remote sensing application in socio-economic planning** Principles of Socio-Economic studies using remote sensing technologies, Socio-Economic information estimation- estimation of Population, Employment, GDP and Electric power consumption, Socio-Economic activity modelling, Advantages and limitations of remote sensing technologies in socio-economic application. **3. Sustainable planning** Sustainable demographic growth, Vulnerability analysis: Conceptual framework, GIS – remote sensing place-based modelling **4. Ecological mapping and monitoring** GIS & Remote sensing for ecological mapping & monitoring, Use of GIS data ecological application- gradient analysis	12 12 12 12

	- climate - topography, Remote sense data for ecological application - spectral enhancements - land cover - Habit Structure -Biophysical process, Species distribution model- Biodiversity mapping, change detection	
Pedagogy:	Lectures/ Case analysis/ Assignments/In class interaction	
Main text: **Additional References**	• Mesev, Victor (2007)- Integration of GIS and Remote Sensing-Wiley • Martin Wegmann, Benjamin Leutner, Stefan Dech (2016),Remote Sensing and GIS for Ecologists: Using Open Source Software, Pelagic Publishing, UK. • What uses Geographical Information Systems in Spatial Economics? https://www.newyorkfed.org/medialibrary/media/research/conference/2009/jrs/Overman.pdf • Robert Nash Parker, Emily K. AsencioJay, D. Gatrell, Ryan R. Jensen(2009), Planning and Socioeconomic Applications, Springer, Dordrecht. • Quantum Geographic Information System (QGIS) training manual https://docs.qgis.org/3.10/en/docs/training_manual/index.html • Otto Huisman, Rolf A. de (2009), Principles of geographic information systems: an introductory textbook, The International Institute for Geo-Information Science and Earth Observation (ITC), Netherlands. • J. M. Pogodzinski, Richard M. Kos(2013), Economic Development & GIS, Esri Press. • Jay D. Gatrell, Ryan R. Jensen (2009), Planning and Socioeconomic Applications, Springer Science & Business Media. • Fahui Wang (2014), Quantitative Methods and Socio-Economic Applications in GIS, CRC Press.	

Learning Outcomes	The students will be able to extract and process Satellite images using open source software and use it to study economic and demographic change.	

Programme: M. A. Economics

Course Code: Eco 132 **Title of the Course:** Game Theory-I

Number of Credits: 2 **Total Contact Hours**: 24

Effective from AY: 2020-21

Prerequisites for the course:	Students must have knowledge of economics and mathematics.	
Objective:	This course is intended to provide students with an Introduction to game theory and basic application in Economics	
Content:	**1.Introduction to Game Theory** Introduction to game theory, The theory of Rational Choice, Payoff Function, Preference Relations, Uncertainty and time: Risk, Nature and Random outcomes **2.Static Game Theory** Normal form and Extensive forms of games, Dominance, Nash Equilibrium Mixed Strategy equilibrium. **3. Dynamic Game theory** Subgame Perfection, Backward induction, Repeated games	8 Hours 8 Hours 8 Hours
Pedagogy:	lectures/ case analysis/assignments/class room interaction	
References/Readings * Main text for reading	• Aliprantis, C.D. and Chakrabarti, S.K. (2012), Games and Decision Making, Oxford University Press, Oxford. • *Binmore, Ken (2012), Fun and Games: AText on Game Theory, Oxford University Press, Oxford. • Binmore, Ken (2012), Playing for Real: AText Book on Game Theory, Houghton Mifflin Company, USA • Dixit, Avinash.;Skeath, Susan and Reliey, David H. (2015), Games of Strategy, W. W. Norton & Company, New York. • *Romp G. (1997), Game Theory Introduction and Applications, Oxford University Press, Oxford. • Lambertini, Luca (2011) Game Theory in Social Sciences, Routledge, London & New York. • Martine, Osborne . (2009), An Introduction to Game Theory, Oxford University Press, Oxford. • Rasmusen, E. (2007), Games and Information, Blackwell, Maiden, M.A. • Tadelis, S (2013), Game Theory: An Introduction, Princeton University Press. • *Watson, Joel (2013) Strategy: An Introduction to Game	

	Theory, W. W. Norton & Company, New York.	
Learning Outcomes	3. The students will be able to understand theGame theory and its basic application in decision making	

Programme: M. A. Economics

Course Code: Eco 232 **Title of the Course:** Game Theory II

Number of Credits: 2 **Total Contact Hours**: 24

Effective from AY: 2020-21

Prerequisites for the course:	Game Theory-I	
Objective:	This course is intended to provide students with a comprehensive treatment of game theory with specific emphasis on applications in Economics	
Content:	**1. Information and Game Theory** Asymmetrical, Incomplete information, Risk and incentives in contracting- Risk Aversion, Principal-Agent Game , Market for lemons, Auctions, Information Aggregation **2.Game Theory and Non-collusive Oligopolies** Theoretical Considerations- Game Theory and Cournot Model, Stackelberg Model, Bertrand Model.	14 Hours 10 Hours
Pedagogy:	lectures/ case analysis/assignments/class room interaction	
References/Readings * Main text for reading	• Aliprantis, C.D. and Chakrabarti, S.K. (2012), Games and Decision Making, Oxford University Press, Oxford. • *Binmore, Ken (2012), Fun and Games: AText on Game Theory, Oxford University Press, Oxford. • Binmore, Ken (2012), Playing for Real: AText Book on Game Theory, Houghton Mifflin Company, USA • Dixit, Avinash.;Skeath, Susan and Reliey, David H. (2015), Games of Strategy, W. W. Norton & Company, New York. • *Romp G. (1997), Game Theory Introduction and Applications, Oxford University Press, Oxford. • Lambertini, Luca (2011) Game Theory in Social Sciences, Routledge, London & New York. • Martine, Osborne . (2009), An Introduction to Game Theory, Oxford University Press, Oxford. • Rasmusen, E. (2007), Games and Information, Blackwell, Maiden, M.A. • Tadelis, S (2013), Game Theory: An Introduction, Princeton University Press. • *Watson, Joel (2013) Strategy: An Introduction to Game Theory, W. W. Norton & Company, New York.	
Learning Outcomes	4. The students will be able to understand the Game theory and its advanced application in decision making	

Goa Business School, Economics Discipline

SWAYAM Courses Recommended by the BOS in Economics, with credits assigned

Sl. No	Name of the Course	Instructor	Offered By	Duration	Start Date	No. of Credit
1	Economics of Health and Health Care	Prof. AnganSengupta IIT Kanpur	NPTEL	8 Weeks	17-08-2020	2
2	Energy Economics And Policy	Prof. ShyamasreeDasgupta, IIT Mandi	NPTEL	8 Weeks	17-08-2020	2
3	Introduction to Banking and Financial Markets.	By P C Narayan, Indian Institute of Management Bangalore (IIMB)	IIM-B	6 Weeks	27-07-2020	2
4	Mathematical Finance	Prof. N. Selvaraju, Prof. Siddhartha PratimChakrabarty - IIT Guwahati	NPTEL	12 Weeks	20-07-2020	3
5	Introduction to R Software	Prof. Shalabh IIT Kanpur	NPTEL	8 Weeks	17-08-2020	2
6	Innovation, Business Models and Entrepreneurship	Prof. RajatAgrawal, Prof. Vinay Sharma - IIT Roorkee	NPTEL	8 Weeks	17-08-2020	2
7	Organic Farming for Sustainable Agricultural Production	Prof. Dillip Kumar Swain, IIT Kharagpur	NPTEL	8 Weeks	20-07-2020	2
8	Academic Writing	By Dr Ajay Semalty, HNB Garhwal University	CEC	15 Weeks	20-07-2020	4
9	Financial accounting – IIT,Mandi	Prof. Puran Singh, IIT Mandi	NPTEL	12 Weeks	20-07-2020	3

6 to 8 weeks= 2 credits, 12 weeks = 3 credits , 15 weeks= 4 credits

ANNEXURE 1- Course Structure

MSc International Hospitality and Tourism Management

Duration:- 2 years full time (Semester pattern) credit based system

No. of credits:-64

Code	**Year 1 Semester 1**	**Credits**	**Course**
MHC111	Advanced Hospitality Management	4	core
MHC112	International Tourism Management	4	core
MHC113	Advanced International Human Resource Management	4	core
MHC114	Advanced Revenue Management for Hospitality	4	core
	Total	**16 credits**	

Code	**Year 1 Semester 2**	**Credits**	**Course**
MHC211	Management Information Systems in Hospitality	4	core
MHC212	Methodology of Teaching	4	core
MHC213	Entrepreneurship in Tourism	4	core
MHC214	Advanced Marketing Management	4	core
	Total	**16 credits**	

Code	**Year 2 Semester 3 Optional Courses (any 4)**	**Credits**	**Course**
MHO311 MHO312 MHO313 MHO314 MHO315 MHO316	Event Management Educational Management and Administration Negotiations and Conflict Management Cruise Line Management Travel Agency & Tour Operations Management Leadership	4 credits each	Optional any 4
	Total	**16 credits**	

MSc International Hospitality and Tourism Management

Duration:- **2 years full time (Semester pattern) credit based system**

Code	**Year 2 Semester 4**	**Credits**	**Course**
MHC411	Internship 8 weeks (2 months) December-January	8	Core
	Optional Courses (**any 2**)	4 credits each	Optional any 2
MHO411	Sustainable Tourism Management		
MHO412	Advertising Management in Tourism		
MHO413	Consumer Behaviour		
MHO414	Marketing Research		
MHO415	Resort Management		
	Total	8	
	Total	**16 credits**	

ANNEXURE II- MSc International Hospitality and Tourism Management

Course List and Detailed Syllabus

Code	Course Title	Credits	Course Category
MHC111	Advanced Hospitality Management	4	core
MHC112	International Tourism Management	4	core
MHC113	Advanced International Human Resource Management	4	core
MHC114	Advanced Revenue Management for Hospitality	4	core
MHC211	Management Information Systems in Hospitality	4	core
MHC212	Methodology of Teaching	4	core
MHC213	Entrepreneurship in Tourism	4	core
MHC214	Advanced Marketing Management	4	core
MHO311	Event Management	4	Optional
MHO312	Educational Management and Administration	4	Optional
MHO313	Negotiations and Conflict Management	4	Optional
MHO314	Cruise Line Management	4	Optional
MHO315	Travel Agency & Tour Operations Management	4	Optional
MHO316	Leadership	4	Optional
MHC411	Internship 8 weeks (2 months) December-January	8	Core
MHO411	Sustainable Tourism Management	4	Optional
MHO412	Advertising Management in Tourism	4	Optional
MHO413	Consumer Behaviour	4	Optional
MHO414	Marketing Research	4	Optional
MHO415	Resort Management	4	Optional

ADVANCED HOSPITALITY MANAGEMENT

Credits: 4 Credits **Contact: 48 hours**

Objective

The course is designed to understand the structure, nature and operating characteristics of the different sectors of the hospitality industry, food service, and lodging.

Learning Outcome

The students will acquire knowledge of different departments in the Hotel Organization and analyse the emerging trends in Hospitality industry.

UNIT – I **(12 hours)**

Front Office Management

Definition of a hotel, classification of accommodation establishments based on location, size, affiliation and accreditation, ownership, management contracts.

Grading of star category for hotels, categories of national and international hotels chains, hotel meal plans, hotel guest room types and status.

Functional units in the hotel, function of the core departments of the hotel, front office and back office departments in a hotel, rooms division and food and beverage department, organizational structure.

Guest relationship management: concierge-travel desk, skills and personality traits of hospitality staff, complaint handling, emergency situations, importance and use of property management systems (PMS) in hospitality industry.

UNIT II **(10 hours)**

Food & Beverage Management

Menu management, food and beverage (F & B) controls, cycle of control, hazard analyses and critical control points (HACCP), emerging trends in F & B operations, managing quality in F & B operations, quality assurance program , five gap analysis.

UNIT III

(10 hours)

Accommodation Management

Customer relationship management, customer expectations, service delivery, wow factor future trends, market segmentation, hospitality distribution channels, functions of housekeeping department, linen and laundry operations, interior designing, interior decoration, facility planning and management , hotel renovation, horticulture.

UNIT – IV **(10 hours)**

Timeshare and Resort Management Concept of time share, recreation & entertainment, wellness & spa management, vacation ownership, definition of time share and condominiums, marketing of timeshares, exchange companies, Resort Condominiums of International (RCI) and intervals international, developing vacation ownership concept.

Concept of resort management, types of resorts, characteristics, special considerations in resort planning and development, importance of guest activities in resort management

UNIT – V **(6 hours)**

Environmental Management and Safety

Waste management, pollution control, water conservation, developing energy conservation, safety standards, security systems.

Pedagogy

The sessions will be conducted using all or any of the methods of pedagogy such as lectures, exercises, practicals, seminars, case studies, role plays, and problem solving, to enable the students to learn in an interactive mode.

Minimum depth of coverage will be at the level of the following books/readings

1. Sharma, Yogendra K, Hotel Management, Kanishka publication, Latest edition.
2. Davis, Bernard, Andrew Lockwood, Peter Alcott and LoannisPantelidis, Food & Beverage Management,Butterworth-Heinemann; latest edition.
3. Andrew, Sudhir, Introduction to Tourism and Hospitality Industry, Tata McGraw-Hill, latest edition.
4. Andrew, Sudhir, Hotel Housekeeping Operations, Tata McGraw-Hill, latest edition.
5. Andrew, Sudhir, Hotel Front office Operations, Tata McGraw-Hill, latest edition.
6. Raghubalan and SmriteeRaghubalan, Housekeeping Operations, Tata McGraw-Hill, latest edition.
7. Mill, Robert, Resorts Management and Operation, Wiley Publications, latest edition.
8. Chuck Yim Gee, World of Resorts from Development to Management American Hotel & Motel Association, latest edition.
9. Hotel Facility Planning– TarunBansal – Oxford University Press, latest edition.

INTERNATIONAL TOURISM MANAGEMENT

Credits: 4 Credits **Contact: 48 hours**

Objective

The course aims to develop an insight into fields and patterns of international tourism in terms of past, present and future perspectives besides looking into the forces and factors influencing tourism growth.

Learning Outcome

At the end of the course the students will be able to understand the patterns of international tourism movements across the globe.

UNIT I **(10 hours)**

International tourism

Globalization and tourism sector, globalization and the business world, the tourism industry, challenges, factors affecting global & regional tourist movements, demand and origin factors, destination and resource factors, contemporary trends in international tourist movements.

UNIT II **(8 hours)**

Impacts and Significance of tourism:

Economic, social, cultural and political impacts and significance of tourism, (both positive and negative) Employment generations, earnings of foreign exchange, regional development, national integration and International understanding and world peace.

UNIT III **(10 hours)**

Emergence of international hotels & tourism organizations

The emergence of international hotels and tourism , historical aspects, development of chain of hotels, airline connection, political aspects of the international travel, tourism, barriers to travel, tourism investment and business, regulations, international organizations dealing with barriers like World Trade Organization (WTO), International Monetary Fund (IMF), International Hotels Association (IHA), need for government support of tourism, national tourism organizations, political stability, travel advisories, political risk, crisis management.

UNIT IV **(10 hours)**

Multinational environment and cultural diversity

International hotels, balancing global and local perspectives, operating in a multinational environment, international rules and regulations, a brief study of human resources and cultural diversity, understanding cultural diversity, cultural perceptions, business protocol, cultural-considerations in negotiations.

UNIT V **(5 hours)**

International tourism marketing

International tourism sales & marketing, market research, developing an international marketing strategy, understanding various travel distribution systems viz: Global Distribution System (GDS), product positioning.

UNIT V I **(5 hours)**

Tourism growth and global competition

Global competition and the future, long term tourism growth trends, tourism growth in major regions, transportation developments, technology and automation, development issues, tourism and the environment.

Pedagogy

The sessions will be conducted using all or any of the methods of pedagogy such as lectures, exercises, practicals, seminars, case studies, role plays, and problem solving, to enable the students to learn in an interactive mode.

Minimum depth of coverage will be at the level of the following books/readings

1. Vellas, Francois & Lionel Becherel - The International Marketing of Travel and Tourism: A Strategic approach,Palgrave, latest edition.
2. R.K. Sinha – Growth and Development of Modern Tourism, Dominant Publishers, latest edition.
3. Bhatia, A.K., 'International Tourism: Fundamentals and Practices'. Sterling Publications, New Delhi. Latest edition.
4. Horner, Susan and John Swarbrooke. 'International Cases in Tourism Management'Routledge, London. Latest edition.
5. Verma ,Vivek , Tourism Management, Centrum Press, Bengaluru latest edition.
6. Goeldner& Ritchie, Tourism Principles, Practices and Philosophies, Johan Wiley & Sons latest edition.
7. Pender, L., & R. Sharpley, The Management of Tourism, Sage Publications, latest edition.

ADVANCED INTERNATIONAL HUMAN RESOURCE MANAGEMENT

Credits: 4 Credits **Contact: 48 hours**

Objective

The course aims to enhance the insight of the students regarding the various Human Resource Practices & concepts in Organizations

Learning Outcome

At the end of the subject, the student will have the competence in following the HR practices of the organization

UNIT- I **(10 hours)**

Pattern and philosophy of management

Implications in personnel function, concept and scope of personnel management vis-a-visbehavioral science and interdisciplinary approach, human resources in a Comparative perspective, international recruitment and selection policy, recruitment procedures, cultural factors/Issues in performance management, developing international staff and multinational teams.

UNIT II **(10 hours)**

Man power planning

Organization, direction, control, coordination leadership, communication, delegation, approaches to international compensation, repatriation, managing global diverse workforce. Industrial relations in a comparative perspective, global unions.

UNIT III **(10 hours)**

Human resource management

Role and responsibilities of HR, training process, methods of training, tools and aids, evaluation of training programs, job description, job analysis, job evaluation, job satisfaction, internal motivation, wages, Fringe benefits, promotion, reward management.

UNIT IV (**8 hours)**

Trends and issues

Industrial relations: Nature, importance and approaches of industrial relations, Labour relation, role of trade Unions and labor, collective bargaining, , human resource managers, major challenges faced by them in 21st century

UNIT- V **(10 hours)**

Disciplinary and grievance procedures

Disciplinary procedure, grievance handling procedure,resolving disputes, managing ethical issues, HR Audit and evaluation, promotion and transfer, reason of transfer, lay-off, resignation, dismissal, retrenchment, Voluntary Retirement Scheme.

Pedagogy

The sessions will be conducted using all or any of the methods of pedagogy such as lectures, exercises, practicals, seminars, case studies, role plays, and problem solving, to enable the students to learn in an interactive mode.

Minimum depth of coverage will be at the level of the following books/readings

1. Daniels, John D. Jeffrey A. Krug, International Business and Globalisation, sage publication, latest edition
2. Dhar, Upinder and S. Ravishankar, Executive Skills for Global Managers, Himalaya Publishing House Pvt. Ltd. Latest edition.
3. Aswathappa K, Human Resource Management, McGraw Hill Education (India Pvt. Ltd.) New Delhi-latest edition.
4. Ivansevich – Human Resource Management, Tata McGraw Hill, latest edition.

ADVANCED REVENUE MANAGEMENT FOR HOSPITALITY

Credits: 4 Credits **Contact: 48 hours**

Objective

This course aims to provide an understanding of the aspects of revenue management.

Learning Outcome

At the end of the course students will know the components of revenue management and pricing, and evaluate historical price/demand data to identify distinct customer segments and target them with the right product at the right time and at the right price.

UNIT- I **(8 hours)**

The Revenue Management Process

Theories of pricing, brief review of microeconomic and marketing theories on consumer behavior and pricing, product design, bundling and demand segmentation, dynamic pricing policies.

UNIT –II **(10 hours)**

Differential Pricing

Principles of revenue management, differential pricing and application, limits to differential pricing.

Unit –III **(10 hours)**

Revenue management for food service operators

Traditional food service pricing methods, cost against cost based food service pricing, applying differential pricing in food services, factors affecting value perceptions in food services, Food and Beverage analysis, examination of revenue sources.

UNIT IV **(10 hours)**

Implementing of Revenue Management System

Elements of revenue management: group room sales, transient room sales, food & beverage activity, local and area-wide activities, special events, potential high and low demand tactics, implementing revenue strategies/availability strategies, computational methods in revenue management, performance measurement.

UNIT V **(10 hours)**

Competitive Factors

Imperfect segmentation model: discrete choice models, customer management and strategic purchasing behavior, revenue management process management (organizational issues) industry implementations and practices related to capacity management in airlines, hotels, car rentals, cruises.

Pedagogy

The sessions will be conducted using all or any of the methods of pedagogy such as lectures, exercises, practicals, seminars, case studies, role plays, and problem solving, to enable the students to learn in an interactive mode.

Minimum depth of coverage will be at the level of the following books/readings

1. Phillips, Robert L, Pricing and Revenue Optimization Stanford Business Book, latest edition.
2. Talluri. K, and G. Van Ryzin,The Theory and Practice of Revenue Management, Kluwer Academic Publishers, latest edition.
3. Hayes, David K and Allisha A. Miller, Revenue Management for hospitality Industry, Willey Publisher latest edition.

YEAR 1 SEMESTER 2

MANAGEMENT INFORMATION SYSTEMS IN HOSPITALITY

Credits: 4 Credits **Contact: 48 hours**

Objective

This Course aims to familiarize students with the concept of Management Information Systems & their use in modern day hospitality.

Learning Outcome

At the end of the course the students will be able to apply technical skills and understanding in the hospitality industry or their workplace.

UNIT-I **(10 hours)**

Managerial Applications of Computers

Spreadsheet software and managerial applications, computer and management functions, computer based financial systems, computer based inventory systems.

UNIT II **(10 hours)**

Information Systems

Information systems for rooms division management, property management system, various modules related to reservations, registration, cashiering, telephones, guest history, housekeeping - various reports generated in the front office and their purpose, room occupancy report, front office cashier report, guest in-house report, expected arrival report, expected departure report , occupancy forecasting reports.

UNIT III **(10 hours)**

Computerized reservation system

Introduction to global distribution systems (GDS) & hotel distribution on GDS, management information systems (MIS) for key decisions, guests data base, keeping track of guests profile, needs, expectations, projection and monitoring of occupancy levels.

UNIT IV **(10 hours)**

Information System for Accounting

Night audit, reports generation and analysis, night auditors report, credit limit report, high balance report, tariff posted for the day report, rate variance/rate check report, today's arrivals report, settlement summary.

UNIT V **(8 hours)**

Marketing Information Systems

Marketing cycle and components of marketing information system, sales support systems, market segment report, business source report, company profile and company masters (corporate tie-up details) -channel systems.

Pedagogy

The sessions will be conducted using all or any of the methods of pedagogy such as lectures, exercises, practicals, seminars, case studies, role plays, and problem solving, to enable the students to learn in an interactive mode.

Minimum depth of coverage will be at the level of the following books/readings

1. Jaiswal, Mahadeo& Monika Mittal, Management Information Systems – Oxford Publication latest edition.
2. O'Connor Peter, Using Computers in Hospitality, Thomson Learning, latest edition
3. Jawadekar, W.S,Management Information Systems, Tata McGraw-Hill Publishing Company Limited, latest edition
4. Leidner, Dorothy, and Ephraim Mc Lean, and James Wetherbe, Organisations in the Digital Economy, John Wiley & Sons, latest edition

METHODOLOGY OF TEACHING

Credits: 4 Credits **Contact: 48 hours**

Objective

The course aims to prepare the students to become effective teachers in the field of hospitality and tourism.

Learning Outcome

At the end of the course the students will be able to use various methods and techniques for transaction of curriculum

UNIT I **(10 hours)**

Teachers and Teaching Profession

Teaching profile, changing roles and responsibilities of teachers, teaching as a profession, and professional ethics for teachers, teacher accountability.

UNIT II **(10 hours)**

Teaching Techniques

Concept of pedagogy and andragogy, principles and techniques of andragogy, simulated teaching, microteaching, approaches to student teaching , case analysis; analysis of effective teachers.

UNIT III

Teaching Concepts and approaches **(10 hours)**

Concept and nature of teaching, reflective teaching: concept and strategies, theories of teaching, models of teaching: concept attainment; inquiry training; advance organiser model, inductive teaching model, approaches to teaching-learning, behaviouristic approach, systems approach; cognitivistic approach, constructivist approach. Classroom management strategies, classroom communication, ethics in classroom, types of communication in classroom

UNIT IV

Evaluation and Assessment (10 hours)

Transactional approaches in curriculum organization and transaction for the foundation courses exposition, participation, collaborative, peer coaching and inquiry, scope and possibility of organization and evaluation and evaluation lecture cum discussion, group discussion, seminar, use of multimedia/ICT and e-resources – micro teaching, evaluation techniques- self appraisal, peer evaluation, reflective journals, portfolio assessment, evaluating classroom process (including internship)

UNIT V (8 hours)

Continuing Professional Development of Teachers

Concept and importance of professional development, approaches of professional development, inclusive education, self-study, participation in seminars, workshops, panel discussion, symposium, organization of study groups and study circles, role of professional organization in teacher education.

Pedagogy

The sessions will be conducted using all or any of the methods of pedagogy such as lectures, exercises, practicals, seminars, case studies, role plays, and problem solving, to enable the students to learn in an interactive mode.

Minimum depth of coverage will be at the level of the following books/readings

1. Caggart, G.L. Promoting Reflective Thinking in Teachers. Crown Press. Latest edition
2. J.J. Irvine,Educating teachers for diversity: Seeing with a cultural eye. New York: Teachers College Press. Latest edition
3. B., Joyce, and Weal, M. Modals of Teaching Boston: Allyn& Bacon. Latest edition
4. Lampert, M. (2001). Teaching problems and the problems of teaching. New Haven: Yale University Press.
5. Hammond, Linda Darling & John Bransford, Preparing Teachers for a Changing World. Jossey-Bass, San Francisco, latest edition
6. D. J. Martin, & Kimberly S. Loomis: Building Teachers: A constructivist approach to introducing education. Wadsworth Publishing, USA. Latest edition
7. D. Schon: Educating the Reflective Practitioner: Towards a New Design for Teaching and Learning in the Professions. New York, Basic Books, latest edition
8. G.H. Arora, Teachers and their teaching. Need for new perspectives
   Ravi book, Delhi, latest edition.
9. Stephen P., Robin, Organizational Behaviour Prentice Hall Pub. Pvt. Ltd. latest edition
10. Blanchard, P. Nick, and James w. Thacker, Effective Training System Strategies & Practices, Pearson Custom, latest edition.

ENTREPRENEURSHIP IN TOURISM

Credits: 4 Credits **Contact: 48 hours**

Objective

The course aims to enrich the students understanding about the concepts and scope of entrepreneurship in tourism and to inculcate entrepreneurial competencies to encourage students to take up tourism entrepreneurship ventures.

Learning Outcome

At the end of the module the students will be geared up to take up special challenges of starting new ventures and introducing new product and service ideas

UNIT - I

Entrepreneurship in Tourism (10 hours)

Concept and definition, functions of entrepreneurship, theories of entrepreneurship, entrepreneurial motivations, theories of entrepreneurial motivation with reference to tourism industry, entrepreneurship opportunities in tourism: conventional, non-conventional and secondary opportunities, entrepreneurial characteristics for travel, tourism and hospitality trade, advantages of entrepreneurship to society, factors affecting entrepreneurship growth, challenges of entrepreneurship in tourism.

UNIT II (10 hours)

Small Scale Enterprises

Concept and definitions, classification & definition of industries, essentials, features & characteristics of small scale enterprises, need and rationale of Small Scale Industries (SSI) development, role of entrepreneurship/SSI in economic development, entrepreneurship vis-a-vis liberalization, privatization & globalization, challenges of small scale industries in tourism.

UNIT III (10 hours)

Tourism Entrepreneurship

Policy measures for tourism entrepreneurship in India, objectives of tourism policy of India, tourism entrepreneurial competencies, developing entrepreneurial competencies, successful startups and ventures, entrepreneurial process: idea generation, identification of an opportunity, market assessment, analyzing competitive situation, understanding trade practices, resource mobilization.

UNIT IV **(8 hours)**

Financial Planning

Concept and meaning, need of financial planning, role of government. Institutions in entrepreneurship/SSI development, business plan, elements of business plan, preparation of business plan, site selection, feasibility report, role of technology in tourism business.

UNIT V **(10 hours)**

Forms of Business ownership

Sole proprietorship, partnership, selection of an appropriate ownership structure, HR issues in tourism & hospitality industry ,strategies for growth and stability for tourism, risk taking, innovation, creativity and growth in tourism.

Pedagogy

The sessions will be conducted using all or any of the methods of pedagogy such as lectures, exercises, practicals, seminars, case studies, role plays, and problem solving, to enable the students to learn in an interactive mode.

Minimum depth of coverage will be at the level of the following books/readings

1. Bedi, Kanishika, Management & Entrepreneurship, Oxford, New Delhi, latest edition.
2. Bird B.J. Entrepreneurial Behavior: John Wiley & Sons, latest edition
3. Peter F., Drucker, Innovation and Entrepreneurship, Harper; NY, latest edition.

ADVANCED MARKETING MANAGEMENT

Credits: 4 Credits **Contact: 48 hours**

Objective

This course is designed to enable the students to understand the elements of marketing management and related processes.

Learning Outcome

At the end of the course the students will be able to identify the various marketing strategies in an industry

UNIT I **(10 hours)**

Marketing Sustainability

Marketing concept, marketing from production to sustainability and customer orientation, understanding the concept of need, want and demand, concept of product and brand business environment in India and overseas, demand states and marketing tasks, company orientation towards the market place.

UNIT II **(10 hours)**

Market Potential Analysis

Forecasting and market potential analysis, consumer buying process and organizational buying behaviour, pillars of marketing, market segmentation, target marketing, positioning and differentiation, marketing mix and product decisions, product life cycle, and brands

UNIT III **(10 hours)**

Product development process

New product development process pricing decisions, distribution decisions, logistics and channel decisions (retail, ecommerce,) promotion decisions, integrated marketing communications concept, advertising, sales promotions, public relations, direct marketing, communication tools

UNIT IV **(10 hours)**

Marketing Strategies

Personal selling and sales management, overview of marketing strategies, Boston Consulting Group (BCG), Ansoff Matrix, GE Matrix, Shell Model, Porter Generic Model, 5 Forces Model, Product Life Cycle (PLC) 7s Model of Marketing, Arthur D Little Model, Value Chain Model.

UNIT V **(8 hours)**

Effective Management of Service Marketing

Services life cycle, methods of positioning services, internal marketing of services, market defender strategies (blocking, retaliation, adaptation) external v/s internal orientation of service strategy, marketing supply through market segmentation.

Pedagogy

The sessions will be conducted using all or any of the methods of pedagogy such as lectures, exercises, practicals, seminars, case studies, role plays, and problem solving, to enable the students to learn in an interactive mode.

Minimum depth of coverage will be at the level of the following books/readings

1. Perreault Jr., William, Joseph Cannon and E. Jerome McCarthy, Basic Marketing, McGraw-Hill Education; latest edition.
2. Ramswamy V.S. and S. Namakumari, Marketing Management Planning, Implementation and Control, Macmillan, latest edition.
3. Hutt, M. Business Marketing Management, Cengage Learning, latest edition.
4. Clow, Kenneth / David Kurtz, Services Marketing, J. Wiley & Sons, latest edition.

YEAR 2 SEMESTER 3

Optional Courses Syllabus

Credits: 4 Credits **Contact: 48 hours**

EVENT MANAGEMENT

Objective

The course will enable the students to organize events meetings, conventions and events/exhibitions in a professional way, and get familiar with management techniques and strategies required for successful planning, promotion, implementation and evaluation of special events.

Learning outcome

The students will be able to organize events from Conception, designing, planning, and budgeting to execution.

UNIT I **(10 hours)**

Event Planning

Importance of organizing events and its components, techniques, selections, coordination logistics & role of event planner, logistics and process, event planning tools, creativity, designing, and set-up of special, corporate and sports events, statutory permissions from government agencies, budget preparation, estimating fixed and variable costs, cash flow, sponsorships and subsidies.

UNIT II **(10 hours)**

Design and logistics

Venue design, site design, technical design, health & safety, adaptation and coordination, follow-up with event coordinators, run charts, audio-visual production, negotiation, flight booking of artists & guest, visa assistance, hotel booking, airport and hotel transfers, booking of conference facilities and technical equipment i.e. sound, lights, audio visual facilities, hiring of interpreters, catering services, secretarial support, preparation of badges, name plates, conference kits, brochures, posters, backdrop, panels, standees, banners and crowd handling.

UNIT III **(8 hours)**

Information and Technology

Use of designing applications like photo shop for photo editing and creating designs and logos, use of designing applications like coral draw, use of designing applications like adobe premiere pro training for video editing, recording and publishing proceedings.

UNIT IV **(10 hours)**

MICE

Organisational structure of Meetings Incentives, Conferencing Exhibitions (MICE) , meeting and convention venue**,** hotels, convention centre, conference centre, retreat facilities, cruise ships, specific use facilities, college and universities, organisation of the exhibition, exhibition service contractor, exhibition planning, from the exhibitors' perspective, exhibition design principles sponsorship for MICE, promotions of conference and exhibition, marketing of exhibition/ conference, delegate registration and kit.

UNIT V **(10 hours)**

Weddings and special events

Wedding planning, for different types of wedding, wedding themes, catering, bridal dress, flower arrangement, transport, invitation, photographer, weddings hire and entertainment. Identifying the best venue choices for weddings and special events, venue recce, analyzing requirements, choose the best destination for weddings, analyzing different locations for weddings and special events.

Pedagogy

The sessions will be conducted using all or any of the methods of pedagogy such as lectures, exercises, practicals, seminars, case studies, role plays, and problem solving, to enable the students to learn in an interactive mode.

Minimum depth of coverage will be at the level of the following books/readings

1. Fenich, George G: Meetings, Expositions, Events and Conventions, An Introduction to the industry, PearsonEducation, latest edition.
2. Robbe, Deborah,Expositions&TradeShows,Wiley, LatestEdition.
3. Allen, Jude, Event Planning, WileyIndia, latest edition.
4. Van Der Wagen, Lynn and Brenda Carlos, Event Management for Tourism, Cultural,Business and Sporting Events, Pearson, latest edition.
5. Shone, Anton & Bryn Parry, Successful Event Management, A Practical Handbook, CengageLearning, latest edition.
6. Sharma, Diwakar, Event Planning & Management, Deep & Dee, latest edition.
7. Goldblatt, Dr. Joe CSEP, Special Events: Event Leadership for the new world. Wiley Publication, latest edition.
8. Levy, Barbara R, Successful Special Events: Planning, Hosting and Evaluating, AspenPublication, latest edition.
9. Knox Beckius, Kim: The Everything Outdoor Wedding Book, Adams Media Avon,latest edition.
10. Bowdin, Glenn A.J. et al, Events Management, Taylor & Francis Ltd., latest edition.

EDUCATIONAL MANAGEMENT AND ADMINISTRATION

Credits: 4 Credits **Contact: 48 hours**

Objective

The course aims to equip the students with knowledge and skills in educational administration and management.

Learning Outcome

The course intends to familiarize the students with the concept, purpose, principles and approaches of educational administration and management studies in higher education.

UNIT I **(10 hour)**

Educational administration

Process, functions and theories of educational administration, (purposing, planning, organizing, operating, direction, coordination and control, and evaluating) conceptual difference: educational organization, educational administration, educational management, stages of educational administration, centralization and decentralization, concept and importance of personnel administration.

Unit II **(10 hours)**

Educational Management concept and process

Management concept and need of management, characteristics of good management, management at different levels of education, role of stakeholders in effective institutional management: college management committee, teachers, parents/guardians, emerging substructures: implications of management: higher education, Open University system.

UNIT III **(10 hours)**

Application of Management concept in Academic areas of the educational systems

Self-appraisal, service conditions of teachers, professional growth, in service training, time management, group dynamics and motivation, recent trends in research and innovation in the field of education management.

UNIT IV **(8 hours)**

Information and Communications Technology (ICT)

Nature and evolution of Educational Technology, Information Technology, and Information and Communication Technology (ICT), effectiveness of education through ICT, teaching-learning system, design, development and potential of ICT, approaches to ICT, enrichment through ICT, education policies related to ICT in education.

UNIT V **(10 hours)**

Recent Trends in Educational Management

Globalization and internationalization and their impact on educational policy, decentralized planning and management, problems and issues, institutional autonomy and accountability, assessment and accreditation in education, concept role of International Standards Organization (ISO) Quality Council of India (QCI), National Assessment and Accreditation Council (NAAC).

Pedagogy

The sessions will be conducted using all or any of the methods of pedagogy such as lectures, exercises, practicals, seminars, case studies, role plays, and problem solving, to enable the students to learn in an interactive mode.

Minimum depth of coverage will be at the level of the following books/readings

1. Bhatnagar, R.P. and Agrawal, V, Educational Administration Supervision, Planning and Financing. R. Lall Book Depot, Meerut, latest edition
2. Kimbrough, S. Ralph, Michall& Nunnery. Educational Administration New York: McMillan co, latest edition.
3. James M. Liphem, Leadership and administrative in Behavioral Science and administration Chicago, Uni. of Chicago Press, latest edition.
4. Newman Summer, The process of Management: Concept, Behaviour and Practice, Prentice Hall of India Pvt. Ltd. latest edition.
5. Priorities for research Campbell R. F. and Gogg R. T. Administrative Behavioral in Education, Harper Brothers, New York, latest edition
6. Stepher Robin P. Organizational Behaviour. Prentice Hall Pub. Pvt. Ltd. latest edition.
7. Simon, Herbart A. Administrative Behaviour. New York: McMillan Company, latest edition.
8. D. Burhalis, E-Tourism: Information Technology for strategic Tourisms Management. Pearson Publications Ltd. Essex, U.K. latest edition
9. Anderson, Neil. Equity and Information Communication Technology (ICT) in Education. Peter Lang Pub. New York, latest edition.

NEGOTIATIONS AND CONFLICT MANAGEMENT

Credits: 4 Credits **Contact: 48 hours**

Objective

The course aims at providing a systematic introduction of concepts, theories and practices of negotiations and handling conflicts.

Learning Outcome

At the end of the course the students should be able to use the required skills in negotiating, collective bargaining and managing conflicts at workplace.

UNIT I **(10 hours)**

Negotiating a Contract

Pre-negotiation , preparing the charter of demand(s), creating the bargaining team, costing of labour contracts, the negotiation process, preparing for negotiation, communication style, breaking deadlocks, strategy and tactics/games negotiators play, closing successfully, negotiating integrative agreements, reviewing.

UNIT II **(15 hours)**

Collective Bargaining:

Definitions, characteristics, critical issues in collective bargaining, theories of collective bargaining, collective bargaining in India, role of government, collective bargaining and the Indian industrial relations system, levels of bargaining, coverage and duration of agreement, concept of managerial prerogatives, difficulties in the bargaining process, administration of agreements, negotiation and collective bargaining, approaches and phases in collective bargaining, coalition bargaining and fractional bargaining, impasse resolution, contract

UNIT III **(15 hours)**

Conflict Management

Conflict management and conflict dynamics, role of communication in conflict management, origins of conflict, dispute prevention, assessment of conflict, conciliation, mediation; conflict management and organization policy.

UNIT IV **(8 hours)**

Grievance Management

Causes, sources of grievances and how to locate them, legislative aspect of a grievance procedure, managerial practices to prevent grievances, grievance resolution, union's perspective on grievance resolution.

Pedagogy

The sessions will be conducted using all or any of the methods of pedagogy such as lectures, exercises, practicals, seminars, case studies, role plays, and problem solving, to enable the students to learn in an interactive mode.

Minimum depth of coverage will be at the level of the following books/readings

1. Malhotra, D. & M. Bazerman, Negotiation Genius, Bantam Dell, latest edition
2. Stone, Patton &Heen, Difficult Conversations; Viking Press, latest edition.
3. Mattock, John & J Ehrenborg, How to be a better Negotiator, Kogan Page Publishing, latest edition.

CRUISE LINE MANAGEMENT

Credits: 4 Credits **Contact: 48 hours**

Objective

This course is designed to understand the operational aspects of the cruise line industry.

Learning Outcome

At the end of the course the students will learn contemporary Cruise Line operations and the practical considerations of working on board.

UNIT I **(10 hours)**

Contemporary Cruise Operations:

Evolution of cruise line industry, elements of cruising, and cruise line brands, cruise geography and terminology, and hierarchy of the cruise ship, historical command structure, and organizational structure of modern cruise industry, selling cruises and cruise products, brand values and vessel classifications, cruise destination, planning the itinerary, shore excursions.

UNIT II **(10 hours)**

Living and working on board

Recruitment practices, role and responsibilities on a cruise ship, the management of hotel services, ship board culture, managing a multi-cultural crew and passengers, working on board and its practical considerations.

UNIT III **(10 hours)**

Managing food and drinks operations

Supplies and services, food production and service delivery systems, role of provision store department on a cruise ship, identifying food receiving and storing procedures and their importance to the overall operation of the department, food safety.

UNIT IV **(10 hours)**

Facility management

Accommodation, aesthetics, recreational facilities, hygiene and sanitation, waste and garbage management, environmental issues, marine- pollution.

UNIT V **(8 hours)**

Health Security and Safety

Dealing with customers with special needs, dealing with emergency situations, safety at sea, assessing risks, centers for disease control and vessel sanitation program and inspection, medical insurance.

Pedagogy

The sessions will be conducted using all or any of the methods of pedagogy such as lectures, exercises, practicals, seminars, case studies, role plays, and problem solving, to enable the students to learn in an interactive mode.

Minimum depth of coverage will be at the level of the following books/readings

1. Gibson, Philip, Cruise Operation Management, Butterworth- Heinemann(Elsevier) latest edition
2. Dowling, R. K., Cruise ship tourism. CABI. Org, latest edition.
3. Mancini, M., The CLIA guide to the cruise industry. Cengage Learning, latest edition
4. Papathanassis, Vogel, M., A., &Wolber, B., The business and management of ocean cruises. CABI. Org, latest edition

TRAVEL AGENCY AND TOUR OPERATIONS MANAGEMENT

Credits: 4 Credits **Contact: 48 hours**

Objective

The course equips the students with knowledge and skills to manage Travel Agency and Tour Operations in the tourism industry.

Learning Outcome

At the end of the course the students will have the ability to use the management processes to effectively manage travel agency and tour operations.

UNIT I **(12 hours)**

Travel Agency

Travel agency business perspective, significance of travel agency business, various services provided by travel agencies travel trade network skills and competencies for running a travel agency , travel agency business model, setting up a travel agency , travel agency organization, sources of revenue, threats in travel agency business .

UNIT II **(12 hours)**

T**our Operation Management,**

Characteristics of tour operation, special services for charter operators, local operator and tour operator business relationship/partnership, concept of tour bundling, travel formalities, package tour & its increasing demand & value, pricing strategies of package tours, revenue from tour operation business, tour operator's reservation procedure, integration in the travel industry, business conflicts , package tour business issues.

UNIT III **(12 hours)**

Ancillary Tourist sector

Ancillary services and businesses, role of ancillary services, types of ancillary services financial services, marketing services, technical services , services from tourist guides, animateurs, destination and attraction competitiveness, travel publications, future of ancillary services.

UNIT IV **(12 hours)**

Contemporary Trends & Practices

Tourism in the twenty-first century, factors contributing to the growth of global tourism, future of global and regional tourism, changing patterns in travel & tourism, emerging tourism destination countries, new competitive global emerging destinations, globalization & liberalization in travel and tourism.

Pedagogy

The sessions will be conducted using all or any of the methods of pedagogy such as lectures, exercises, practicals, seminars, case studies, role plays, and problem solving, to enable the students to learn in an interactive mode.

Minimum depth of coverage will be at the level of the following books/readings

1. Swain and Mishra, Tourism principles and Practices Oxford University Press, latest edition.
2. Cooper, Chris, John Fletcher, Alan Fyall, David Gilbert, Tourism Principles & Practice Financal Times Management, latest edition.
3. Wanhill, Stephen, Pearson Education Principles of Tourism, M. A. Khan, Penguin Books, latest edition.

LEADERSHIP

Credits: 4 Credits **Contact: 48 hours**

Objective

The course aims at developing leadership skills in the participants and to enable them to take decisions in organisations.

Learning Outcome

At the end of the course the students will be able to identify the qualities of good leadership in different types of organisations

UNIT I **(12 hours)**

Introduction to Leadership

Leadership and person, personality, cultural values and ability, leadership that gets results, playing to your strengths, emotional intelligence, models of leadership, leadership and followership, leadership theories, traits, situational, and functional leadership, leadership and power, leadership and influence, interpersonal conflict and negotiation, leadership in groups and teams.

UNIT II **(12 hours)**

Leadership and Organisation

Organisations as complex systems, strategy, structure and environment, organizational culture, leading organizations, leading teams, design and structure, leadership and communication, leadership in organizations, leading change

UNIT III **(12 hours)**

Leadership Development

Identifying potential leaders, leader development vs. leadership development in organization, process of leadership development, developmental readiness of employees, tools and interventions for developing leadership.

UNIT IV **(12 hours)**

Special leadership dimensions

Identifying potential dark/negative leadership, corrective measures, public leadership, education leadership, spiritual leadership, and transformational leadership, leadership in different types of organisations, small businesses, family business, and multinational organizations.

Pedagogy

The sessions will be conducted using all or any of the methods of pedagogy such as lectures, exercises, practicals, seminars, case studies, role plays, and problem solving, to enable the students to learn in an interactive mode.

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Minimum depth of coverage will be at the level of the following books/readings

1. Hughes, RL, R C Ginnett, GJ Curphy, Leadership Tata McGraw Hill, latest edition.
2. Kouzes, James & Barry Posner, The Leadership Challenge, Jossey-Bass, Latest edition.
3. Owen, J, The Leadership Skills Handbook, Kogan Page Publishing, latest edition.
4. Rowe, WG, L Guerrero, 'Cases in Leadership' Sage Publications, latest edition.
5. Zenger, JH & JR Folkman, The Extra ordinary Leader', Tata McGraw Hill,latest edition.

YEAR 2 SEMESTER 4

SUSTAINABLE TOURISM MANAGEMENT

Credits: 4 Credits **Contact: 48 hours**

Course Objective

The course emphasizes on the role of sustainable tourism in the changing global scenario.

Learning Outcome

At the end of the course the students will understand the global significance of sustainable tourism

UNIT I **(10 hours)**

Sustainable tourism development

Conventions and ethics relating to sustainable tourism, sustainable tourism & its dimensions, historical background, nature and scope of sustainable tourism, critiques of current thinking in sustainable management, new approaches to sustainable tourism management, sustainable tourism three dimensions : environmental dimension, economic dimension, social dimension.

UNIT-II **(10 hours)**

Role of different agencies in sustainable tourism

Public sector, tourism industry, voluntary sector, host community, media, tourist in coastal areas and sea, rural area, urban areas, mountainous regions, islands, developing countries, role of marketing in promotion of sustainable tourism

UNIT-III (**10 hours)**

Sustainable tourism & responsible tourism

Sustainable tourism development-guiding principles for planning and management, responsible tourism, key characteristics of responsible tourism, empowering community through tourism, community based tourism and global climate change-issues and challenges.

UNIT-IV

Green Tourism **(8 hours)**

Eco purchasing, environmentally preferred suppliers, environmentally preferred products, energy and water conservation, high efficiency lighting in guest rooms and public areas, solar panels, water conservation fixtures, chemical free landscaping, green house- keeping, green banqueting, (carbon credits, organic and locally procured food-green menu)

Unit-V

Standardization and Certification for Tourism Sustainability: **(10 hours)**

ISO 14000- Role of World Travel & Tourism Council (WTTC), United Nations World Tourism Organization (UNWTO), Pacific Asia Travel Association (PATA), United Nations Environment Programme (UNEP), International Union for Conservation of Nature (IUCN), Global observatory on sustainable tourism in Sustainable Tourism Development. - Agenda 21 for Travel and Tourism Industry; Global Significance of Sustainable Tourism (GOST) and Global Sustainable Tourism criteria and Council (GSTC).

Pedagogy

The sessions will be conducted using all or any of the methods of pedagogy such as lectures, exercises, practicals, seminars, case studies, role plays, and problem solving, to enable the students to learn in an interactive mode.

Minimum depth of coverage will be at the level of the following books/readings

1. Griffin, Tony, Sustainable Tourism, A Global perspective by Rob Harris, Peter Williams, butterworth-Heinemann, latest edition.
2. World Tourism Organization, Sustainable Development of Tourism: An Annotated Bibliography, latest edition.
3. Herremans, lrene, Cases in Sustainable Tourism; an Experimental Approach to Making Decisions, The Haworth Press, latest edition.
4. Swarbrooke, J. Sustainable Tourism Management, CABI publishers, latest edition.
5. Kirk, David, Environmental Management for hotels,Taylor and Francis, latest edition.

ADVERTISING MANAGEMENT IN TOURISM

Credits: 4 Credits **Contact: 48 hours**

Objective

The course enables the student to understand advertising management in tourism, with its creative and ethical aspects.

Learning Outcome

At the end of the course, the student will gain in-depth knowledge in advertising process, relate to importance of Integrated Marketing Communications (IMC) for promotion, objectives and budgeting of IMC Media Process and the evaluation of media and its control.

UNIT I **(12 hours)**

Advertising in Tourism

Role of advertising in marketing, effective advertising techniques, marketing and promotion in tourism and leisure, promotion management and advertising strategy, promotional tools.Creative strategy, planning, development, implementation and evaluation of advertising, client evaluation and approval of creative work.

UNIT II **(12 hours)**

Integrated Marketing Communication

Promotion mix, role of IMC in marketing process, organizing for advertising and promotion, Advertising agencies, agency compensation, evaluating agency, specialized, collateral and IMC services, Perspective on consumer behavior, consumer decision making process, alternative approaches to consumer behavior.

Objectives and Budgeting for IMC: value of objectives, determining IMC objectives, Defining Advertising Goals for Measured Advertising Results (DAGMAR) approach, establishing & allocating promotional budget.

UNIT III **(12 hours)**

Media Planning and Strategy and Evaluation of Media

Overview of Media Planning, Developing media plan, Market analysis and Target Market Identification. Evaluation of Media: Characteristics of Media, Television, Radio, Print, Support, Internet and Interactive Media.

UNIT IV **(12 hours)**

Advertising Research

Role of research in advertising, advertising execution, research techniques, research applications, evaluating advertising performance, monitoring, evaluation and control, measuring effectiveness of promotional programmes, conducting research to measure effectiveness, evaluating the social, ethical and economic aspects of advertising & promotion.

Pedagogy

The sessions will be conducted using all or any of the methods of pedagogy such as lectures, exercises, practicals, seminars, case studies, role plays, and problem solving, to enable the students to learn in an interactive mode.

Minimum depth of coverage will be at the level of the following books/readings

1. Belch, George E & Michael A Belch, 'Advertising & Promotion', McGraw Hill Education (India) Private Limited, latest edition.
2. Chaudhary, Manjula, Tourism Marketing, Oxford University Press, latest edition.
3. Morgan, Nigel & Annette Pritchard, Advertising in Tourism and Leisure, Routledge, latest edition

CONSUMER BEHAVIOUR

Credits: 4 Credits **Contact: 48 hours**

Objective

The course enables the students to understand the significance of consumer behaviour and how individuals make their decision to spend their available resources.

Learning Outcome

At the end of the course, the participants will develop competence in analyzing consumer behavior to make marketing decisions.

UNIT I (10 hours)

Definition and Process

Definition and importance, marketing strategy and consumer behaviour, market segmentation, external influences, internal influences, consumer decision process, problem recognition, information search, alternative evaluation and selection.

UNIT II **(14 hours)**

External influences

Concept of culture, values, time space and symbols, global culture, self- oriented, environment oriented and other oriented values, green marketing, cause related marketing, demographics, occupation, education, income, age social stratification, measurement of social class, sub cultures, Household and family, household life cycle, family roles, conflict resolution, consumer socialization, marketing to children, brand communities, nature and degree of reference group influence, opinion leadership, diffusion of innovations.

UNIT III **(12 hours)**

Internal Influences

Perception, attention and interpretation, perception and marketing strategy, learning theories, memory, brand image and product positioning, theories of motivation and marketing strategy, personality and marketing, emotions, attitude components, formation and attitude change, self-concept and lifestyles

UNIT IV **(12 hours)**

Organizational Buying

Characteristics, roles and decision making units, decision making process, choice criteria, new buy and rebuy, purchasing practices (just in time , leasing), relationship marketing (customer relationship management) post purchase behavior.

Pedagogy

The sessions will be conducted using all or any of the methods of pedagogy such as lectures, exercises, practicals, seminars, case studies, role plays, and problem solving, to enable the students to learn in an interactive mode.

Minimum depth of coverage will be at the level of the following books/readings

1. Hawkins, Del I., R.J Best, K. A Coney and A. Mukherjee, Consumer Behavior: Building marketing strategy, Tata McGraw Hill, Latest Edition.
2. Schiffman, Leon and Leslie Kanuk, Consumer Behavior, Pearson Education, latest edition

MARKETING RESEARCH

Credits: 4 Credits **Contact: 48 hours**

Objective

The course aims to build proficiency in carrying out marketing research.

Learning Outcome

At the end of the course, the students will develop competence in designing research studies, collecting and analyzing data and preparing and presenting reports. They will also be able to use research output for decision making

UNIT I **(12 hours)**

Research Design

Problem definition, theoretical framework, analytical model, research questions, hypotheses, information specification, ethics in marketing research, research design, exploratory research, descriptive research, experimental research, cross sectional versus longitudinal research.

UNIT II **(12 hours)**

Measurement and scaling

Measurement and scaling, nominal, ordinal, interval and ratio scales, Likert, semantic differential and staple scales, reliability and validity, questionnaire design, question structure, question wording, order of questions, form design.

UNIT III **(12 hours)**

Data collection and preliminary analysis

Sampling, defining target population, non-probability and probability sampling, sample size determination, data collection methods and field work, coding, data entry and data preparation, frequency distribution, cross tabulation and chi-square, analysis of variance

UNIT IV **(12 hours)**

Multivariate analysis

Correlation and regression analysis, simple and multiple regression, interpretation of results, discriminant analysis, factor analysis, extraction and rotation methods, logistic regression, cluster analysis, multidimensional scaling, report preparation and presentation, usage of a statistical package.

Pedagogy

The sessions will be conducted using all or any of the methods of pedagogy such as lectures, exercises, practicals, seminars, case studies, role plays, and problem solving, to enable the students to learn in an interactive mode.

Minimum depth of coverage will be at the level of the following books/readings

1. Malhotra, Naresh K, Marketing Research: An applied orientation, Pearson Education, latest edition.
2. Hair, Joseph F, Robert P Bush and David J Ortinau, Marketing Research within a changing information environment, Tata McGraw Hill, latest edition.

RESORT MANAGEMENT

Credits: 4 Credits **Contact: 48 hours**

Objective

This course is designed to understand the managerial and operational aspects of a resort.

Learning Outcome

At the end of the course students will be able to apply management principles, operations and techniques to different resort business.

UNIT I **(10 hours)**

Introduction to resorts & resort management:

Types of resorts, characteristics of resort operations and management, visitor market, facilities, location, recreation, seasonality, service attitude, managers of resort properties, corporate and employer responsibility, employee housing, labour skills, sources of revenue, activity control, land, buildings & fixed assets, resorts & traditions, industry trends.

UNIT II **(10 hours)**

Resort planning & development

Investment considerations, market feasibility, resort financing, forms of ownership, sale of vacation & timeshare ownership, social impacts, community relations, social impact assessment, types of social impact, lifestyle changes & cultural impacts, economic impacts, employment, residents versus newcomers, quality of life, economic costs, public costs for visitor services, infrastructure requirements & demands, recreational development, physical & environmental impacts, physical effects of development, pace & rate of development, congestion, pollution, conservation, enhancements & alterations.

UNIT III **(10 hours)**

Mountain based (Ski) resorts:

Site feasibility (desirable sites) general design considerations, potential capacity planning considerations, ski run design considerations, types of lifts at mountain ski resorts, planning the base area, parking, access roads, food service, accommodation, maintenance and emergency care, mountain resort maturation cycle, economic feasibility, the critical variables, demographic sub-segment mix for analysis

UNIT IV **(8 hours)**

Beach resorts and marinas

The development process of beach resorts and marinas, beach development, desirable sites and evolution, managing the resort, water quality, environmental management, safety and service, onshore and offshore marinas, recreational opportunities.

UNIT V (**10 hours)**

The importance of guest activities in resort operations

Guests needs, cluster & activity analysis, program planning, program evaluation, the tourist shopping, resort retail, merchandising, customer segments, profit ratios, waterparks and specialty resorts, nature-based environmental activities, ecotourism, eco adventure.

Pedagogy

The sessions will be conducted using all or any of the methods of pedagogy such as lectures, exercises, practicals, seminars, case studies, role plays, and problem solving, to enable the students to learn in an interactive mode.

Minimum depth of coverage will be at the level of the following books/readings

1. Resorts Management and Operation – Robert Mill - Wiley Publications World of Resorts from Development to Management AHLEI Publication, latest edition
2. Morphy, Peter E. The Business of Resort Management, Butterworth –Heinemann, latest edition.

INTERNSHIP REPORT AND PRESENTATION

Credits: 8

- Students will undergo professional internship at a reputed starred hotel, multinationaltourism/hospitality organisation, or Tourism or Hospitality based Educational Institutes for a period of 8 weeks (2 months) in consultation with the guidingfaculty.
- The students will have to maintain a log register duly signed by the hotel/organisation/Educational Institution and at the end of the internship will have to prepare a report.

ANNEXURE III- PART AMENDMENT TO OA-18A Ordinance governing the M.A., M.Sc. M.Com., M.S.W., M.T.T.M., and **M. Sc. I.H.T.M.** programmes of study conducted by the on-campus Departments of the Goa University and its affiliated colleges in the Faculties of Languages and Literature, Social Sciences, Natural Sciences, Life Sciences and Environment, and Commerce and Management, based on the Choice Based Credit System of Instruction (Effective from 31st August, 2018)

Existing Provision	**Modification Proposed For M.Sc International Hospitality And Tourism Management Programme of Goa University 2020-2021.**	**Justification**
OA-18A.1 General (Effective 31st August, 2018) The eligibility, procedure and conditions for admission to the M.A., M.Sc., M.Com., M.S.W. and M.T.T.M. Programmes and the rules governing (i) reservation of seats in each Department, (ii) merit list, (iii) registration and payment of fees shall be as provided in the respective Ordinances/notifications		
OA-18A.2 Programme Structure 1. The Programme shall be based on a system of time-integrated Units called Credits, under the Choice Based Credit System (CBCS) and shall comprise Core Courses, Optional Courses and Dissertation (optional). 2. A student shall be eligible for the award of Master's Degree on successful completion of minimum of 64 Credits, to be completed over a minimum of four Semesters. 3. The total number of 64 Credits shall comprise 32 for Core Courses and a minimum of 32 for Optional Courses. 4. A student shall be required to obtain 48 Credits from the parent Department in which the student is registered, which shall comprise the 32 Core Credits, and 16 optional credits which may include the dissertation. The remaining 16 Credits may be earned by the student by opting for optional Courses, including dissertation, from within the Department or outside the Department/University. 5. The Courses may cover only theory, theory and tutorial or only practical, or any other activity as specified under OA-18.2.6. 6. Optional Courses may also comprise self-learning Courses in the form of field work, project, summer training, online Courses, and other such Courses; the BoS shall specify the Credits for these activities. 7. A student shall also be permitted to obtain additional Credits. The degree/final grade shall be awarded /computed based	3. The total number of 64 Credits shall comprise 32 for Core Courses and a minimum of 32 for Optional Courses.**However for M.Sc. I.H.T.M. the core courses shall comprise of 40 credits including internship and minimum of 24 credits for Optional courses.**	Internship is necessary for all students being a professional course. Internship Component has been introduced based on Industry requirements.

on his/her performance in Core Courses and the best performance in the Optional Courses, to fulfill the minimum number of Credits required for the award of the Master's Degree. Additional Credits, if any, shall be depicted in the final transcript/mark sheet. 8. Permission to transfer Credits in case of Institutions not affiliated to Goa University, may be allowed on a case to case basis, following the Credit recognition procedure. Such Courses, when opted for by the students of a Department, may be approved provisionally by the Departmental Council and placed for ratification before the Board of Studies at its subsequent meeting. 9. A Course may be a minimum of 1 Credit and up to a maximum of 6 Credit(s). 10. One Credit of a Theory Course shall be equivalent to 12 contact hours of learning activities including lecture, group discussion, seminar, problem solving, tutorial, assessment and such others. 11. One Credit of a Practical Course shall be equivalent to 24 clock hours of laboratory /field work/ study tour, that is, 12 practical sessions each of 2 clock hours duration, or its equivalent. However, in the case of Psychology subject, one credit of the Practical Course (Psychology Experiments and Psychological Testing) shall be equivalent to 12 clock hours of laboratory/field work/study tour. 12. Ordinarily, the ratio of Credits between theory and practical/laboratory/field Core Courses shall not be less than 2:1 or as recommended by the concerned Board of Studies. 13. The Departments shall notify the Core and Optional Courses offered to students for the following Semester. The Department shall also provide for adequate number of Optional Courses in case a student desires to obtain all Credits from the parent Department. 14. Minimum number of students for an Optional Course shall be not less than five. In case there are less than five students for a Course, the permission of the Vice-Chancellor shall be obtained before the commencement of teaching for the said Course. 15. Dissertation shall be of 8 Credits and in	11. One Credit of a Practical Course shall be equivalent to 24 clock hours of laboratory /field work / study tour, that is, 12 practical sessions each of 2 clock hours duration, or its equivalent. However, in the case of Psychology subject, one credit of the Practical Course (Psychology Experiments and Psychological Testing) shall be equivalent to 12 clock hours of laboratory/field work/study tour. **For M.Sc. I.H.T.M., One Credit shall be equivalent to one week of Internship**	1 Credit will be equivalent to 1 week internship (6 days x 8hrs = 48 hours)

lieu of Optional Courses. 16. A student shall not be permitted to register for less than 8 Credits and more than 20 Credits in a Semester, during the two- year Programme. However, in case the dissertation is being carried out only in Semester IV, entailing extensive field work, and/or work at other institutions, the student may be permitted to register for only the dissertation comprising 8 Credits. 17. A Core Course offered by a Department may be selected by a student as an Optional Course provided the pre-requisites defined by the concerned Board of Studies are fulfilled by the student.		
OA-18A.3 Scheme of Instruction	Same	
OA-18A.4 Dissertation 1. Ordinarily, the Dissertation shall be spread over third and fourth Semesters and shall not generally constitute an entire Semester-equivalent of Credits. However, the DC/DFC may consider on case to case basis and reduce it to one Semester, if it involves full field-work or dissertation in other Institutes or Industries. 2. The DC/DFC shall decide at the end of the second Semester, the modalities relating to the dissertations, which shall be informed to the students. 3. Topics for dissertations shall be finalized by the student in consultation with the guiding teacher. 4. The DC/DFC shall decide the number of students each teacher can guide with an equitable distribution of students to Guides for sharing the workload. Such workload shall be computed as two hours per week per student, up to a maximum of four hours per week for two or more students. 5. The student shall declare, in the prescribed proforma, that the dissertation is his/ her own work and that all the sources used are duly acknowledged. 6. The guiding teacher shall certify, in the prescribed proforma, that the	**OA-18A.4 Dissertation and Internship** **9. For M.Sc. I.H.T.M., The Internships shall be undertaken at the**	Internship Component has been introduced

dissertation is an original work of the candidate completed under his supervision. 7. Students shall submit the dissertations to the Department through the guiding teacher not later than 2 weeks before the end of the term. Ordinarily, no student shall be allowed to submit the dissertation after the due date. 8. Every student shall submit one soft copy on a CD and two bound copies of the dissertation to the Department in the standard format as under: The size of paper: A4 (approximately 29 cm x 21 cm) except for drawings, graphs and maps, on which no restriction is placed, with a margin of 3 cm on the left hand side and 2.5 cm on all the other three sides. The dissertation should be neatly typed in double space and only on one side of the paper. The front cover of the dissertation, bound in a standardized form, should contain the title of the dissertation, the Degree, date and name of the student concerned.	**beginningof the Fourth Semester. On completion of the Internship, each student shall submit an Internship Report to the guiding teacher.**	based on Industry requirements
OA-18A.5 Scheme of Examination 1. The assessment of all Courses including Dissertation shall comprise continuous intraSemester Assessment (ISA) and Semester-end Assessment (SEA) and shall be fully internal. In case of the Programmes which are offered both at Goa University campus and at affiliated Colleges, the examination of core theory papers shall be conducted by the University and common Question Papers along with answer keys for SEA shall be prepared. The SEA of all Core, Practical and all Optional Courses including dissertations shall be conducted by the teachers as decided by respective DC/ DFC. 2. (a) Each teacher of the concerned Course shall be the examiner for the portion he/she has taught. The teacher/ instructor of the Course shall	**OA-18A.5 Scheme of Examination** 1. The assessment of all Courses including Dissertation **and Internships** shall comprise continuous intra Semester Assessment (ISA) and Semester-end Assessment (SEA) and shall be fully internal.	Internship Component has been introduced based on Industry requirements

be the Course Coordinator and shall coordinate the teaching, examination and evaluation (both continuous ISA and SEA) of the Course and maintain records of all assessments/tests/ examinations. (b) When more than one teacher is involved in teaching a Course, one teacher preferably a regular teacher from the Department shall be identified as the Course Coordinator by the DC/DFC. (c) In case of Programmes which are offered at Goa University campus and/or at affiliated Colleges, the assessment of SEA answer books of all core Courses shall be done at respective Department or College as the case may be in a manner specified in OA 18.5 (2) (e). (d) In case of the University Departments, the respective teacher who taught the core course shall assess the answer books based on the answer key provided by the paper setters for the purpose. In case of affiliated colleges, the respective DFC shall decide the teachers for evaluation of core courses depending upon the master panel of examiners specified in OA 18.5 (2) (e). (e) For the purpose of paper setting and evaluation of core courses, the concerned BoS shall recommend a master panel of paper setters and examiners comprising both external and internal (for the purpose of co-ordination),which shall be placed before the Academic Council for approval. Under-graduate teachers in affiliated colleges with Ph.D. degrees and at least three years of post- graduate teaching experience and teachers without a Ph.D. but who have 5 years of post-graduate teaching experience shall be eligible for inclusion in such a panel. 3. (a) The nature of assessments may be Written/Oral, Open/Closed book,		

Scheduled/ Surprise, Objective / Multiple-choice, Short-answer type, Essay type, Seminar, Assignment, Experimental work, Fieldwork, Viva-Voce, Peer group assessment, Class participation as described in the Course outline. (b) For each theory Course, a written or any other evidence-based component shall constitute at least 50% of ISA and SEA. 4. A Course shall have a 'single passing-head' based on the combined performance at the continuous ISA and SEA. Fractional marks shall be rounded off to the nearest integer only at the time of calculating the Course grade. 5. The DC/DFC shall constitute a Departmental Examination Committee (DEC) to monitor the conduct of the continuous ISA and SEA. 6. The Course-wise time-table of internal assessment shall be displayed at the beginning of each Semester. Every teacher shall submit to the Head of the Department (HoD)/Principal,the question paper, assessed answer books and the marks assigned within seven days after the conduct of each assessment. The result of each assessment shall be displayed on the Notice Board and the assessed material shall be shown to the candidate(s) by the concerned teacher and submitted to the HoD along with the question paper in a sealed envelope.		
OA-18A.6 Evaluation of Courses	same	
OA-18A.7 Evaluation of Dissertation 1. (a) The Dissertation shall be assessed by the Guide/Supervisor and by the DC/DFC. The student shall make a presentation of the work before the DC/DFC and students of the Department. The DC/DFC shall assess the work. Average of marks of all teachers attending the presentation shall be the evaluation of the dissertation which shall carry 60% of the	**OA-18A.7 Evaluation of Dissertation and Internships** 1. (a) The Dissertation / **Internship** shall be assessed by the Guide/Supervisor and by the DC/DFC. The student shall make a presentation of the work before the DC/DFC and students of the Department. The DC/DFC shall assess the work. Average of marks of all teachers attending the presentation shall be the evaluation	Evaluation of internship included

total marks assigned for dissertation which shall be the SEA component. (b) The Guide shall assess the Dissertation work independently for 40% marks which shall be the ISA component. The ISA shall be completed by the guide in the third semester based on the modalities decided by the concerned DC/DFC. If a student is willing to discontinue the dissertation due to poor performance in the ISA component, s/he shall be permitted to opt for required number of optional courses in the fourth semester. 2. To pass in the Dissertation a student has to secure a minimum grade of 'P' as indicated under OA-18A.8.2. 3. A student who fails in the dissertation may be permitted to re-submit the dissertation after incorporating suitable modifications under the guidance of the teacher or may be permitted to register for optional courses equivalent to the number of credits assigned to the Dissertation. 4. There shall be no revaluation in case of dissertations which are based on laboratory/field/experimental work.	of the dissertation/Internship which shall carry 60% of the total marks assigned for dissertation / **Internship** which shall be the SEA component. (b) The Guide shall assess the Dissertation/**Internship** work independently for 40% marks which shall be the ISA component. The ISA shall be completed by the guide in the third semester based on the modalities decided by the concerned DC/DFC. If a student is willing to discontinue the dissertation due to poor performance in the ISA component, s/he shall be permitted to opt for required number of optional courses in the fourth semester. 2. To pass in the Dissertation/**Internship** a student has to secure a minimum grade of 'P' as indicated under OA-18A.8.2. 3. A student who fails in the dissertation may be permitted to re-submit the dissertation after incorporating suitable modifications under the guidance of the teacher or may be permitted to register for optional courses equivalent to the number of credits assigned to the Dissertation.**In case of M.Sc. I.H.T.M. a student who fails in internship will have to repeat internship component.** 4. There shall be no revaluation in case of dissertations which are based on laboratory/field/experimental work**and internship**.	
OA-18A.8 Award of Grades		
OA-18A.9 Grievance Committee		
OA-18A.10 Coordination Committee		

Part Amendment to Ordinance OA-20 relating to the Policy of Admission to the Post Graduate Academic Programmes of Goa University (Under Section 24(1) of the Goa University Act, 1984) (Applicable fo

Existing Provision	Modification Proposed For M.Sc	Justification

r candidates who register from the academic year 2018-19 onwards).

	International Hospitality And Tourism Management Programme of Goa University 2020-2021.	
OA-20 Ordinance relating to the Policy of Admission to the Post Graduate Academic Programmes of Goa University (Under Section 24(1) of the Goa University Act, 1984) (Applicable for candidates who register from the academic year 2018-19 onwards).		
OA-20.6.6 - Deleted –	OA-20.6.6 **A candidate for being eligible for admission to a course leading to the Degree of Master of Science in International Hospitality And Tourism Management shall have passed the examination of the Degree of Bachelor of Sciencein International Hospitality Management/Hospitality Studies/Hotel Management/Tourism & Hospitality Management /Hotel & Hospitality Administration /Home Science from a recognized University in India or abroad.**	M.Sc. I.H.T.M course is a progression to the bachelors' courses as prescribed.

Goa University

Goa University, Taleigao Plateau, Goa 403 206

Syllabus of M.Sc. (Zoology) Programme

(To be followed from the Academic year: 2020-21)

Programme Name: M. Sc. Zoology

Programme Code: ZO

Programme description:

This program is intended to develop learning about Zoology and significance of fauna ranging from single cell to multi-cellular systems. Keeping in mind the Departmental thrust area "Biodiversity and Comparative Animal Physiology", the current Post graduation curriculum has been totally restructured. A precise balance between the classical courses and modern biological courses has been made to introduce and emphasize the skill based programmes with an Internship experiences. Apart from the classical topics on Animal Sciences namely, Taxonomy and Systematics; Biodiversity; Anatomy of Non chordates and Chordates, this syllabus also covers topics on various aspects of Life Processes such as Animal Physiology, Endocrinology, Developmental Biology and Molecular Biology. The restructured M. Sc. programme also focuses on various application based or skilled based courses such as Fishery Sciences and Fish Farm Management, Food Processing, Environmental Physiology, Neurophysiology, Stem Cell Biology, Herpetology, Wild Life Biology and Ethology. Besides, the courses like Immunology, Cell Biology, Animal Genetics, Biological Techniques, Biostatistics, Vector Biology programs also represent this restructured syllabus. This programme through the

dissertation will also help the students to understand the basic principles of nature and will also provide scope for hands-on experience to experiment with nature /animals and thereby enable them to develop aptitude for research in various allied fields of animal sciences.

This curriculum will also enable them to overcome several day to day problems faced by our society by providing them with some workable solutions.

Prerequisite for M. Sc. Zoology Programme:

The candidate must pass the Bachelors degree examination in Zoology at T. Y. B.Sc. level or its equivalent credits in Zoology.

Programme Structure:

A student should earn a minimum of 64 Credit Courses to receive M.Sc. (Zoology) degree. Out of 64 credits, 32 credits shall be of Departmental Core Courses and 32 credits are Optional Courses (Including Departmental skilled based optional and general optional / Interdisciplinary / Dissertation). Active participation in Field work component, included in the laboratory core courses, is must for every student. Dissertation work may also be carried out in sister departments of Goa University / neighbouring Institute (within Goa) / in the Industry (within Goa) but it should be under the supervision of one of the faculty member of the Department.

All the Core Courses have to be studied by all students in the first year (Semester I & II). Dissertation (8 Credits) is optional in lieu of equivalent number of credits of courses from the Optional Courses and shall be undertaken in the second year (Semester III & IV).

Timeline for completion of various credits over four Semesters:

SEMESTER	SEM I	SEM II	SEM III	SEM IV
CORE COURSE				
FIELD WORK (included in the lab course)				
SKILLED BASED OPTIONAL COURSE				
INTERNSHIP (included in the lab course)				
SOFT OPTIONAL COURSE				
DISSERTATION				

Note: Empty spaces represent the timeline for the courses indicated

Optional Course			
	SEMESTER III	Total 16 credits	Page Nos
ZOO 301	FISHERY BIOLOGY	3 credits	
ZOO 302	FISH FARM MANAGEMENT	3 credits	
ZOO 303	FISH PROCESSING	3 credits	
ZOO 304	ENVIRONMENTAL PHYSIOLOGY	3 credits	
ZOO 305	NEUROPHYSIOLOGY	3 credits	
ZOO 306	STEM CELL BIOLOGY	3 credits	
ZOO 307	BIODIVERSITY	3 credits	
ZOO 308	HERPETOLOGY	3 credits	
ZOO 309	WILD LIFE ECOLOGY & CONSERVATION	3 credits	
ZOO 310	LAB COURSE (Includes one month optional internship programme which will be for the entire Semester III and Semester IV).	3 credits	
NOTE	**STUDENT HAS TO OPT EITHER 301,302 &303 OR 304,305 &306 OR 307, 308 & 309**	**12 CREDITS**	
ZOO 311	EVOLUTIONARY BIOLOGY	2 credits	
ZOO 312	ENDO CRINOLOGY	2 credits	
ZOO 313	BIO STATISTICS	2 credits	
ZOO 314	VECTOR BIOLOGY	2 credits	
ZOO 315	HISTOLOGY AND HISTOCHEMISTRY	2 credits	
NOTE	**STUDENT HAS TO**	**4 CREDITS**	

	OPT ANY TWO		
	SEMESTER IV	Total 16 credits	
ZOO 401	ANIMAL GENETICS	3 +1 credits	
ZOO 402	ENTOMOLOGY	3+1 credits	
ZOO 403	CELL BIOLOGY	3+1 credits	
ZOO 404	TOXICOLOGY	3+1credits	
ZOO 405	BIOLOGICAL TECHNIQUES	3+1 credits	
NOTE	**STUDENT HAS TO OPT ANY THREE**	**12 CREDITS**	
ZOO 406	SCIENTIFIC COMMUNICATION	2 credits	
ZOO 407	IMMUNOLOGY	2 credits	
ZOO 408	NUTRITIONAL BIOCHEMISTRY	2 credits	
ZOO 409	HELMINTHOLOGY	2 credits	
ZOO 410	ETHOLOGY	2 credits	
ZOO 411	INTRODUCTION TO BIOLOGICAL DATABASES	2 credits	
NOTE	**STUDENT HAS TO OPT ANY TWO**	**4 CREDITS**	
ZOO 412	Dissertation	8 credits	
NOTE	Dissertation should be for the entire Semester III and Semester IV . It is in lieu of 8 credits of any soft optional courses (ZOO).		

Course Code: ZOC 101 **Course Title: Principles of Animal Systematics**

Number of Credits: 3

Effective from AY: 2020 -21

Prerequisite for the Course:	Basic working knowledge of classical and animal taxonomy and systematics.	
Objectives:	This course develops concepts in animal taxonomy and systematic, modern methods of taxonomy and systematics and their application, General Organization and molecular basis of animal taxonomy.	
Content:	**Module 1**	
	Introduction to taxonomy, stages of taxonomy, importance of taxonomy, rise of taxonomy.	**2 hours**
	Principles and rules of taxonomy, Zoological nomenclature, ICZN regulations, new trends in taxonomy, Zoological classification, problems of taxonomists.	**4 hours**
	Taxonomic collections, identification and description, Taxonomical hierarchy (Linnaean hierarchy), Concepts of Taxon, holotype, paratype, topotype etc.	**4 hours**
	Concept of speciation: Biological, Phylogenetic and Evolutionary.	**2 hours**
	Module 2	
	Morphology based taxonomy, Numerical taxonomy, Immuno-taxonomy, Paleotaxonomy, Cyto-taxonomy and Chemotaxonomy.	**4 hours**
	Molecular basis of animal taxonomy, Genetic polymorphism, electrophoretic variations, amino acid sequencing for variety of proteins, DNA-DNA and DNA-RNA hybridization.	**4 hours**
	Systematics - definition and role in biology, Biological classification, Molecular systematics, DNA finger printing and molecular markers for detection/evaluation of polymorphism, RFLP, RAPD etc.	**4 hours**

	Module 3 Phylogenetics: Introduction; Basic terminology, Homology: Convergence, parallelisms and reversals. Phylogentic groups: monophyly, polyphyly, paraphyly. Construction of Phylogenetic trees, by using Cladistics and Phenetic related methods. Cladistics and Cladogram: Parsimony and finding the shortest trees, rooting trees. Molecular divergence, molecular clock, molecular drive.	**3 hours** **1 hour** **6 hours** **2 hours**
Pedagogy:	Lectures/ tutorials/online teaching mode/self-study.	
Learning Outcome:	1. Understand historical and modern methods of animal classification and systematics. 2. Get acquainted with field techniques for taxonomic study and use of literature and identification key. 3. Familiarise with Molecular basis of animal taxonomy.	
References /Reading:	1. Avise JC (2004), Molecular Markers, Natural History and Evolution, Chapman & Hall, New York. 2. Huston AM (1994), Biological Diversity, Cambridge University Press, Cambridge. 3. Kapoor VC (1983), Theory and Practice of Animal Taxonomy, Oxford & IBH Publishing Co. 4. Kato M (2000), The Biology of Biodiversity, Springer. 5. Mayer E (1971), Elements of Taxonomy, Oxford IBH Publishing company. 6. Simpson GG (2012), Principle of animal taxonomy, Scientific Publishers. 7. Tikader BK (1983), Threatened Animal of India, ZSI publication, Calcutta 8. Wilson EO (1988), Biodiversity, Academic Press, Washington. 9. Wilson EO (1992), The diversity of Life, The College edition W.W. Northem & Co.	

Course Code: ZOC 102 **Course Title: Anatomy of Non-Chordates**

Number of Credits: 3

Effective from AY: 2020 -21

Prerequisite for the Course:	Basic knowledge on Non-chordate anatomy, taxonomy and systematics is prerequisite for this course.	
Objectives:	To develop knowledge about fundamental anatomical principles among non-chordates. To understand the adaptive changes anatomical structures have undergone in the course of evolution.	
Content:	**Module 1** Skeletal system types: Endoskeleton-like (Poriferans), Exoskeleton (Arthropods) and Hydrostatic skeleton (Cnidarians, Molluscs and Echinoderms).	**4 hours**
	Annelid Locomotory organs involved in Simple propulsion, Burrowing, Peristaltic waves, Sinusoidal and Inchworm type of locomotion. Primitive and advanced flight muscles of insects.	**4 hours**
	Diffused, Simple ganglionic, Cycloneuralian, Heteroganglionic types of non-chordate Nervous system. Tetraneury plan of molluscan nervous system, Streptoneury, Euthyneury and centralization in molluscs.	**6 hours**
	Module 2 Digestive system types: Channel-network systems, Coelenteronic, Saccular and Tubular systems. Radula of Molluscs and various types of mouthparts in Arthropods.	**4 hours**
	Coelomoduct derived, Gut derived and other excretory organs of non chordates. Calciferous Gland of Earthworms.	**4 hours**
	Reproductive system in arthropods with Gonad-Gonoduct-Gonopore concept with addition of adjunctive organs.	**3 hours**
	Module 3 Respiratory organs and specialized respiratory structures of Annelids, Molluscs and Arthropods.	**5 hours**

	Open and Closed circulatory system concept of Invertebrates. Circulatory system in Annelids, Arthropods and Molluscs. Hearts of Oligochaetes and Bivalves.	**6 hours**
Pedagogy:	Lectures/ tutorials/ online teaching mode/self-study.	
Learning Outcome:	1. Understand the basic concepts associated with each system of the body. 2. Identify structures that are in place in the body systems to perform the functions according to the habits or habitats of the animals.	
References /Reading:	1. Hymen LH (1951), The invertebrates (all volumes), McGraw Hill, Philadelphia, USA. 2. Barnes RD and Ruppert EE (1994), Invertebrate Zoology, Saunders College Publishing. 3. Barrington EJW (1972), Invertebrate Structure and Function, Thomas Nelson and Sons, USA. 4. Marshall AJ and Williams WD (2004), Textbook of Zoology (vol 1). CBS Publishers & Distributors. 5. Jurd RD (2004), Animal Biology, BIOS Scientific Publishers, USA. 6. Cleveland P, Hickman CP, Roberts LS and Larson A (2001), Integrated Principles of Zoology, McGraw-Hill, NY. 7. Barnes RSK, Calow P, Olive PJW, Golding DW and Spicer JI (2001), The Invertebrates: A Synthesis. Blackwell Science 8. Schmidt-Rhaesa A (2007), The Evolution of Organ Systems, Oxford University Press. 9. Gangully BB, Shina AK and Adhikary S (2011), Biology of Animals vol. 1, New Central Agency, Kolkata.	

Course Code: ZOC 103 **Course Title: Animal Biochemistry**

Number of Credits: 3

Effective from AY: 2020 -21

Prerequisite for the Course:	Elementary knowledge on structural biochemistry of Protein, Carbohydrate and Fat.	
Objectives:	To understand the biochemical integrity of various metabolic pathways. To understand metabolic pathways, their regulation, and application in diagnostic and maintenance human well being state.	
Content:	**Module 1** Water as biological solvent; Ionization of water and buffering in biological system.	**3 hours**
	Enzyme Kinetics and enzyme inhibition; Catalytic and Regulatory strategies of Enzymes.	**5 hours**
	Concept of metabolism; Concept of free energy; Coupled reaction; TCA cycle; Electron transport system; Oxidative phosphorylation.	**4 hours**
	Module 2 Regulation of Glycolysis & Gluconeogenesis, Glycogenolysis & Glycogenesis.	**4 hours**
	Integration of Fatty acid synthesis & β Oxidation of fatty acid; Importance of Cholesterol and Lipoprotein in health management; Eicosanoids : types, outline of biosynthesis and their physiological importance.	**6 hours**
	Metabolism of Purine and Pyrimidines.	**2 hours**
	Module 3 Protein and peptide chains; Primary-, Secondary-, Tertiary- and Quaternary structures of protein; Purification of proteins.	**4 hours**
	Protein turn-over and amino acid catabolism; Nitrogen	**4 hours**

	excretory pathways; Oxidation of amino acids; Bio-synthesis of amino acids in animal. Integration of metabolism; Caloric homeostasis; Membrane receptors; Role of calcium and calmodulin in metabolism.	**4 hours**
Pedagogy:	Lectures/ tutorials/ online teaching mode/self-study.	
Learning Outcome:	1. Understanding the various metabolic pathways 2. Understanding the regulation of various metabolic pathways. 3. Understanding the integrative metabolism and life processes. 4. Understanding the application of metabolism in maintenance of human well being state.	
References /Reading:	1. Devlin TM (2010), Text book of Biochemistry with Clinical Correlations, Willey, Oxford. 2. Murray RK, Granner D, Mayes P and Rodwell VW (2000), Harper's Illustrated Biochemistry, McGraw-Hill, Companies, USA. 3. Blanco A and Blanco G (2017), Medical Biochemistry, Academic press. 4. Berg J, Tymoczko J and Stryer L (2002), Biochemistry**,** W H Freeman and Company, New York. 5. Nelson DL and Cox MM (2010), Lehninger's Principles of Biochemistry**,** Freeman WH and Co, USA. 6. Pelley J (2012), Elsevier's Integrated Biochemistry, Elsevier Publication, Amsterdam, The Netherlands.	

Course Code: ZOC 104 **Course Title: Molecular Biology**

Number of Credits: 3

Effective from AY: 2020 -21

Prerequisite for the Course:	Basic knowledge of nuclear and cellular components and functioning of the cell.
Objectives:	This course develops concepts in molecular biology enhancing knowledge about the major processes in the cell throwing light upon the details of the central dogma. This knowledge is a prerequisite for biomedical/ biochemical research and shall enable students to have a clear understanding of all the dynamic processes of the nucleus which can be further applied in various fields of research.

Content:	**Module 1** **Nucleic Acids, bonds, types of DNAs, DNA packaging and model organisms.** Watson and Crick to double helix DNA model. Research work of Rosalind Franklin, Maurice Wilkins, Linus Pauling and Erwin Chargaff on DNA structure. RNA structure. The triple helical structure of the collagen protein by Dr. G.N Ramachandra, and Ramachandran Plot. Different bonding and different types of DNA (B-DNA, A-DNA & Z-DNA). DNA packaging in bacteria (Nucleoid) and Eukaryotes. Chromatin structure, structural features (Telomere, Centromere and Repetitive sequences) of chromosomes and their functions. Lampbrush and polytene chromosomes. Karyotyping (C-banding, G-banding); Chromosomal abrasions and diseases *Drosophila melanogaster* and *Caenorhabditis elegans*as genetic model organisms. Evolution of Genomes: Gene duplication, whole genome duplication, transposable elements, Exon shuffling, Genome reduction and gene loss, mutations, horizontal gene transfer. Paralogous, orthologous, Homeobox genes; and degenerative evolution. **Module 2** **DNA Damage and DNA Repair** Types of DNA damages**:** Double stranded break, single stranded break, Mismatch, deamination, Thymidine dimer, inversion, deletion,	**12 hours**

	insertion, Covalent X-linking, AP site. Different types of Mutagens**:** Base analogues (5-Bromouracil and 2-amino purines), EMS, acridines, NTG, Hydroxylamine; mutagenic radiations- UV, X-rays and gamma rays. Ames test; Auxotrophy; Somatic and germline mutations with examples in Human DNA repair mechanisms in Eukaryotes and Prokaryotes: Nucleotide Excision repair, mismatch repair, recombination repair, homologous end joining, photo reactivation and SOS Repair. Homologous recombinational repair: Role of *RecA/RadA/Rad51* in DNA damage repair. Role of BRCA1 in DNA damage repair. Mutation in BRCA1 as development of breast cancer. Role of p53 protein in DNA repair and tumor suppressor. **Module 3** **How cells read the Genome** DNA to Protein**:** Replication process in prokaryotes and Eukaryotes: Rolling circle/theta model, telomere replication. Transcription in prokaryotes: prokaryotic promotors, Rho dependent and Rho independent transcription termination. Transcription and Post transcriptional modifications in eukaryotes: Eukaryotic promoters, transcription factors and RNA polymerase I, II, III. Transcription Inhibitors. Splicing, 5'-caping, 3'-poly A tail. Various non coding RNAs and their role in different biological processes: rRNA, tRNA, snoRNA, snRNA,exRNAs, scaRNAs, gRNA, Telomerase RNA,long ncRNAs (Xist and HOTAIR). Translation of mRNA in prokaryotes and Eukaryotes: Initiation, elongation and termination. Polycistronic and monocistronic mRNA. Shine-Dalgarno (SD) Sequence, Kozak sequence, IRES sequence, Ribosomes, Genetic code,codon bias, wobble hypothesis, degeneracy of codon. Posttranslational modification of proteins (Protein splicing, phosphorylation,methylation, N-linked glycosylation).Inhibitors of protein synthesis (Aminoglicosides and macrolide antibiotics, Puromycin).	**12 hours** **12 hours**

	RNA world and origin of life: Ribozymes (Ribonuclease P, self-splicing introns I and II, spliceosome, viroids, hair pin ribozyme, hammer head ribozyme).Some viruses contain RNA as genetic material e.g. TMV, HIV; Concept of reverse transcription; Viroid, Virusoid, Prions. Regulation of Gene expression in Prokaryotes and Eukaryotes**:** Heterochromatin and euchromatin – acetylation, phosphorylation, methylation. Epigenetics. Gene dosage effect.Real time PCR technology (qPCR): Absolute quantification and Relative quantification, Cycle threshold (Ct values), SYBR Green Technology and Taq Man probe technology. Various Reporter dyes and quenchers used in Taq Man probe technology. Multiplexing with real-time PCR technology. Regulation of gene expression at transcription level in prokaryotes:*lac* operon and *trp* operon. transcriptional attenuation. Regulation of gene expression at transcription level in eukaryotes: Enhancers, silencers, transcription factors (DNA binding motifs and their role in gene regulatory proteins). Post transcriptional regulation of gene expression: Riboswitches,Alternate splicing, trans splicing, RNA editing, RNA Interference (miRNA, siRNA, piRNA, Fire and Mello Nobel Prize winning experiment). Concept of Transcriptomics and Proteomics. Their application in research and Medical or diagnostics. CRISPR Cas9 Technology: Gene editing. Application of this technology in Medicine.	
Pedagogy:	Lectures/tutorials /online teaching mode/ self-study.	
Learning Outcome:	1. State-of-art knowledge of molecular organisation of chromosomes and genes. 2. 2. Decipher the role of large numbers of molecular events associated with model animal systems and its application in molecular research.	
References /Reading:	1. Clark D, Pazdernik N and McGehee M (2018), Molecular Biology. 3rd Edition, Academic Cell. 2. Davis LG, Dibner MD and Battey JF (1986), Basic Methods in Molecular	

	Biology, Elsevier. 3. Gardner EJ, Simmons MJ and Snustad DP (1991), Principles of Genetics, John Wiley & Sons. 4. Karp G, Iwasa J and Marshall W (2019), Karp's Cell and Molecular Biology, 9th Edition, John Wiley. 5. Krebs JE, Goldstein ES, Kilpatrick ST (2018), Lewin's GENES XII, Jones and Bartlett Learning. 6. Krebs JE, Lewin B, Goldstein ES and Kilpatrick ST (2014), Lewin's Genes XI, Jones and Bartlett Publishers. 7. Malacinski GM (2015), Freifelder's Essentials of Molecular Biology, Narosa

Course Code: ZOC 105 **Course Title: Laboratory Course I**

Number of Credits: 4

Effective from AY: 2020 -21

Prerequisite for the Course:	Basic working knowledge of animal systematics, animal anatomy, biochemistry, molecular biology.	
Objectives:	Laboratory hands on training in certain area of systematics, anatomy, biochemistry and molecular biology. To do a field Survey.	
Content:	**Animal Taxonomy and Systematics** 1. Systematic analysis with proper morphological keys and construction of Phylogenetic keys of the following: - Malacofauna - Lepidoptera - Avifauna - Ichtyofauna - Araneae	**10 lab hours**
	Anatomy of Non Chordates **I. Dissection** 1. Study of Nervous, in Cockroach/Crab (collected from market) 2. Digestive in Prawn (collected from market)/Cockroach and 3. Reproductive system in Cockroach. **II. Mounting** 1. Mounting of Heart in Bivalves 2. Mounting of Visceral and Pedal ganglia in Bivalves. 3. Comparative study of mouth parts in insects.	**10 lab hours**
	Biochemistry 1. Extraction and Estimation of major bio molecules in different tissues of fish. Total Protein & free amino acids / glycogen & glucose/ triglycerides & fatty acid. 2. Determination of Km and Vmax of Na^+-K^+- ATPase/ Acetylcholinestarease. 3. Separation of serum Proteins through SDS-PAGE. (demo) 4. Fractionation of Lipid moieties through TLC. (demo) 5. Titration of an acid with conjugated base.	**10 lab hours**

	Molecular Biology 1. Isolation of Purine/Pyrimidine bases from Nucleic acids and their analysis through spectrophotometer. 2. Separation of Nucleic acids on Agarose gel and relative quantification. 3. Fluorescent In-situ Hybridization using Fluorescent microscopy. 4. Restriction Endonuclease digestion and mapping. 5. m RNA expression studies through PCR **Field Work** Faunistic survey around 1 km radius of his/ her residence during dawn of every weekend for at least 2 month (8 weeks) using Transect or Quadrangle method of two different fauna. One/ Two day visit to Sanctuary in Goa. * In unavoidable circumstances overnight field work will be replaced by extending the time period (from 8 weeks to 10 weeks of weekend faunistic survey). *Evaluation of the field work component will be based on weekly field note and final compiled field report during SEA.	**10 lab hours**
Pedagogy:	Practicals/ Mini projects/ Group Activities.	
Learning Outcome:	Practicals will give hands on training on certain areas based on courses on systematics, anatomy, biochemistry and molecular biology. To know the fauna surrounding own's house.	
References /Reading:	As mentioned under individual course ZOC 101, 102, 103 & 104.	

Course Code: ZOC 201 **Course Title: Comparative Anatomy of Vertebrates**

Number of Credits: 3

Effective from AY: 2020 -21

Prerequisite for the Course:	Basic knowledge on vertebrate anatomy, taxonomy and systematics is prerequisite for this course.	
Objectives:	To develop knowledge about fundamental anatomical principles among vertebrates. To understand the adaptive changes anatomical structures have undergone in the course of evolution.	
Content:	**Module 1** Detailed comparative analysis of Vertebrate brain, Spinal cord and Sense organs. Basic plan of vertebra construction. Axial and Appendicular skeleton of vertebrates and their modification. Classification of vertebrate musculature. Axial and Appendicular musculature of Vertebrates. **Module 2** Digestive system of Vertebrates with special analysis of Herbivore, Carnivore and Omnivore stomach. Excretory system of Tetrapods, Mammalian kidney in detail, Specialized excretory structures such as Rectal Glands (elasmobranchs) and salt glands (reptiles and Birds). Testes and Vasa deferens in anaminiotes and amniotes. Ovary and Oviduct of anaminiotes and amniotes.	**4 hours** **4 hours** **4 hours** **5 hours** **4 hours** **3 hours**

	Module 3 Respiratory structure of fishes, Types of Tetrapod lungs (Alveolar, Faveolar, Parabronchial and Broncho-alveolar). Circulatory systems of Vertebrates, Vertebrate portal systems, Lymphatic system in Tetrapods.	**6 hours** **6 hours**

Pedagogy:	Lectures/ tutorials/ online teaching mode/self-study
Learning Outcome:	1. Understand the basic concepts associated with each system of the body. 2. Identify structures that are in place in the body systems to perform the functions according to the habits or habitats of the animals.
References /Reading:	1. Kardong K (2011), Vertebrates: Comparative Anatomy, Function and Evolution, Sixth edition, McGraw-Hill Companies, USA. 2. Kent CG and Carr R (2000), Comparative Anatomy of Vertebrates, Ninth Edition, McGraw-Hill Companies, USA. 3. Liem KF and Franklin W (2001), Functional Anatomy of the Vertebrates: an Evolutionary Perspective, Third Edition, Harcourt College Publishers, California. 4. Moyces C and Schulte P (2013), Principles of Animal Physiology, Second Edition, Pearson International Edition, USA. 5. Prosser CL (1991), Comparative Animal Physiology, Part A, Environmental and Metabolic Animal Physiology, Fourth Edition, John Wiley & Sons Publication, Oxford. 6. Schmidt-Rhaesa A (2007), The Evolution of Organ Systems, First Edition Oxford University Press. 7. Withers PC (1992), Comparative Animal Physiology, First Edition, Fort Worth: Saunders College Publication. 8. Wolff RG (1994), Functional Chordate Anatomy**,** First Edition, Amazon Publication, UK.

Course Code: ZOC 202 **Course Title: Comparative Physiology of Animals**

Number of Credits: 3

Effective from AY: 2020 -21

Prerequisite for the Course:	Elementary knowledge on animal anatomy, Physiology taxonomy and systematics.	
Objectives:	To provide knowledge of animal body system to reveal physiological homologies, patterns of physiological adaptation to various environments. To introduce various principles that underlies higher level integrative bodily functions. To provide a comprehensive knowledge of functional physiological pathways common to all animals.	
Content:	**Module 1** Nutrition (Feeding and digestion) in Non-chordates. Metagenome of mammalian Gut, Rumen fermentation. Movements of GI tract, control and reflexes. Concept of Gut brain Axis. Excretion and Osmoregulation in Non-chordates in fresh water, marine water and terrestrial environment. Contributions of Crustacean Antennal Glands and Molluscan Mantle to Acid-Base Regulation. Urine formation in Metanephros kidney, Nephrolithiasis-mechanism of Renal stone formation. **Module 2** Composition of Coelomic fluid and hemolymph of Non-chordates, Formation lymph. Physiological difference between Pulmonary and Systemic circulation of higher vertebrates and changes during pregnancy. Lung volumes and their physiological interpretations and changes in lung volumes during pregnancy. Ventilation – Perfusion Physiology. Conducting system of heart, Comparison of action potentials of Pacemaker cell and cardiomyocyte.	**6 hours** **7 hours** **4 hours** **5 hours** **3 hours**

	Module 3 Various types of reproductive modes across Non-chordates, Uterine Physiology, Delayed implantation/Embryonic Diapause and its regulation, Estrous cycles and types of anestrous.	**12 hours**
Pedagogy:	Lectures/ tutorials /online teaching mode/self-study.	
Learning Outcome:	1. Understanding of the basic concepts and processes of physiological regulation, from cellular to organ to organismal. 2. Evaluation of physiological possibilities that animals have developed through natural selection.	
References /Reading:	1. Barnes RSK, Calow P, Olive PJW, Golding DW and Spicer JI (2001), The Invertebrates: A Synthesis, Third edition, Blackwell Science. 2. Moyces C and Schulte P (2013), Principles of Animal Physiology, Second Edition, Pearson International Edition, USA. 3. Prosser CL (1991), Comparative Animal Physiology, Part A, Environmental and Metabolic Animal Physiology, Fourth Edition, John Wiley & Sons Publication, Oxford. 4. Randall D, Burggren W and French KE (2001), Animal Physiology, Fifth edition, WH Freeman and Co, New York. 5. Schmidt-Nielsen K (2001), Animal Physiology: Adaptation and Environment, Fifth Edition, Cambridge University Press. 6. Withers PC (1992), Comparative Animal Physiology, First Edition, Fort Worth, Saunders College Publication.	

Course Code: ZOC 203 **Course Title: Advanced Developmental Biology**

Number of Credits: 3

Effective from AY: 2020 -21

Prerequisite for the Course:	Elementary knowledge of embryology.	
Objectives:	To understand the overall chronology of the development and the role of various morphogens (protein/mRNA) in specification and determination of various organs and body axis formation.	
Content:	**Module 1** Mammalian Gametogenesis including the ultra structure of sperm and egg; Molecular events in mammalian fertilization (capacitation, prevention of polyspermy, genetic fusion , activation of egg metabolism).	**5 hours**
	Cleavage in mammals, difference between somatic mitosis and cleavage, regulation of cleavage.	**4 hours**
	Gastrulation (epiboly and emboly). Development of extra embryonic membrane.	**3 hours**
	Module 2 Mechanism of cell cellular differentiation; Stages of Commitment (differentiation, specification and determination; Cellular communication: Paracrine factors and signal transduction cascades (Jak-Stat pathway, smooth and patched protein pathway, wnt signaling pathway, smad pathway) .	**6 hours**
	Developmental dynamics of cell speciation: Specification of body axes in sea urchin-, insect-, fish-, avian- and mammalian embryo.	**6 hours**
	Module 3 Induction and Competence; Cascade of induction during the formation of lens; epithelium-mesenchyme interaction during formation of feathers in bird.	**3 hours**

	The central nervous system and the epidermis: Primary and Secondary neurulation; Differentiation of the Neural Tube. Embryonic filed; Pattern formation in Vertebrate Limbs, Generation of the Proximal – Distal, Anterior – Posterior, Dorso - Ventral axis of the Limb. Regeneration ability of animals; Role of Interstitial cells in Regeneration in Hydra. Molecular mechanism of regeneration of limb in Salamander.	**3 hours** **3 hours** **3 hours**
Pedagogy:	Lectures/tutorials/online teaching mode/self-study.	
Learning Outcome:	1. Understanding the basic concept of the development 2. Understanding the cyto-differentiation and cellular communication during the process of development. 3. Boosting their concepts and knowledge regulation of gene expression and their interaction.	
References /Reading:	1. Barresi MJF and Gilbert SF (2019), Developmental Biology, 12th edition, Oxford University Press, UK. 2. Carlson BM (2003), Pattern's Foundation of Embryology, Mc Graw Hill Inc., USA. 3. Gilbert SF (2003), Developmental Biology, 5th edition, Sinauer 4.Gilbert SF (2006), Developmental Biology, 8th edition, Sinauer Associates Inc., Sunderland, USA. 5. Gilbert SF (2013), Developmental Biology, 10th edition, Sinauer Associates Inc., Sunderland, USA. 6. Moody SA (2015), Principles of Developmental Genetics, Academic Press., New York. 7. Slack JMW (2012), Essential Developmental Biology, Willey Publication, USA 8. Wolpert L, Tickle C and Arias AM (2019), Principles of Development, Oxford University Press.	

Course Code: ZOC 204 **Course Title: Ecology**

Number of Credits: 3

Effective from AY: 2020 -21

Prerequisite for the Course:	Basic knowledge on Taxonomy, Biodiversity, Environment and Ecology.	
Objectives:	This course will help the learner to understand the concept and components of ecology and its importance, population, community structures along with interactions. Overall the course develops an in depth understanding of the whole ecosysytem ecology and the various related concepts. Additionally, this course also deals with emerging field of molecular ecology, conservation genetics and the environmental aspects highlighting the changing environment and global effects.	
Content:	**Module 1** **Introduction to ecology**; **Environment:** Physical environment; biotic environment; biotic and abiotic interactions; **Habitat and Niche:** Concept of habitat and niche, niche width and overlap, fundamental and realized niche, resource partitioning, character displacement; **Environmental concepts** – laws and limiting factors, ecological models. Ecological structure: Review of six levels of ecological organization and their importance and characteristic features.	**6 hours**
	Population Ecology: Review of Characteristics of a population; population growth curves; population dynamics, regulation and growth limits, fertility rate and age structure, life history strategies (*r* and *K* selection); concept of metapopulation – demes and dispersal, interdemic extinctions.	**3 hours**
	Community Ecology: Review of nature of communities ,community structure and attributes, levels of species diversity and its measurement; edges, ecotones and related concepts.	**3 hours**

	Module 2 **Ecological energetics:** Primary productivity, Gross productivity, Net Productivity. Net ecosystem production and various levels of respiratory losses (Autotrophs, Heterotrophs and decomposer levels), Biomass, Standing crop and Turnover, The Residence Time of Energy, Limiting factors of primary production (Light and Nutrients), Eutrophication, Secondary production, Production efficiency, Earth's Heat budget.	**5 hours**

	Species Interactions <u>Review</u> of Types of interactions, intra-specific and inter-specific interactions, Mutualism, Commensalism, Competition, prey-predator interactions, herbivory, carnivory, pollination, symbiosis.	**2 hours**
	Trophic ecology: Food web (Node, link, basal species, Top predators), Global comparisons of Marine food chains (Coastal regions, Open ocean and High upwelling areas), Types of food webs: connectedness webs, Energy flow webs and Functional webs; Topological webs, Flow webs and Interaction webs, Trophic cascades (Bottom-up and Top-down trophic level controls). Bioaccumulation and Bio-magnification.	**5 hours**
	Module 3 **Ecological Succession: <u>Review</u>** of Trajectory of Succession. Mechanisms/models of ecological succession (Facilitation, Inhibition, Tolerance), Alternative stable states and its model (stability, change & Hysteresis), Regime shifts and its models, Stability and sustainability (inertia/persistence, Constancy, Resilience)	**4 hours**
	Biogeography: Major terrestrial biomes; theory of island biogeography; biogeographical zones of India.	**2 hours**
	Restoration ecology: Ecosystem degradation and restoration model, restoration approaches (Reclamation, Revegetation, Re-creation and Ecological engineering), Structural and Functional restoration type, Active and Passive restoration types, Biomanipulation, Bioremediation and Biological augmentation strategies, restoration in India (Nirmal Ganga Action Plan).	**4 hours**
	Molecular ecology: Genetic analysis of single and multiple population, phylogeography, molecular approach to behavioural ecology, conservation genetics.	**2 hours**
Pedagogy:	Lectures/tutorials/online teaching mode /self-study.	
Learning Outcome:	1. Essential in depth understanding of the concepts and components of ecology. 2. Learner will learn ecosystem structure and function along with the interactions involved at various levels.	

	3. Vision to understand the ecosystem ecology along with sufficient knowledge of energy flow and exchange. 4. Information about molecular ecology and conservation genetics. 5. Sensitization towards the environment with respect to the global scenario and the related problems, impact, along with methods to tackle the problems.
References /Reading:	1. Andel JV and Aronson J (2012), Restoration Ecology: The New Frontier, Second edition, Blackwell Publishing Ltd. 2. Baker AJ (2000), Molecular Ecology, In Molecular Methods in Ecology (ed. AJ Baker), Blackwell Publishing. 3. Chapman JL and Reiss MJ (1999), Ecology: Principles and Applications, Cambridge University Press. 4. Conklin AR (2004), Field Sampling: Principles and Practices in Environmental Analysis, CRC Press. 5. Fahey TJ and Knapp AK (2007), Principles and Standards for Measuring Primary Production, Oxford University Press, UK. 6. Grant WE and Swannack TM (2008), Ecological Modeling, Blackwell. 7. Odum EP and Barrett GW (2004), Basic Ecology: Fundamentals of Ecology, Fifth Edition, Oxford and IBH Publishing Co. Pvt. 8. Perrow MR and Davy AJ (2002), Handbook of Ecological Restoration Vol 2 Restoration in Practice, Cambridge University Press. 9. Sutherland WJ (2006), Ecological Census techniques a handbook, Cambridge University Press. 10. Wilkinson DM (2007), Fundamental Processes in Ecology: An Earth system Approach, Oxford University Press, UK.

Course Code: ZOC-205 **Course Title: Laboratory Course II**

Number of Credits: 4

Effective from AY: 2020 -21

Prerequisite for the Course:	Basic working knowledge of Animal Anatomy, Physiology, Embryology and ecology	
Objectives:	Laboratory hands on training in various aspects of developmental biology, anatomy, physiology and ecology.	
Content:	**Anatomy of Chordates** 1. Preparation of skeleton using a bird (bird to be collected from slaughter house). 2. Exposure of axial muscle of fish (dead fishes to be collected from market). 3. Flight muscles of bird (bird to be collected from slaughter house). 4. Afferent and Efferent branchial system of fishes. 5. Reproductive system of fish (dead fish collected from the market). 6. Cranial nerves (Vth - VIIth and IXth - Xth) of teleosts. (dead fish collected from the market). **Animal Physiology** 1. Study of human lung volumes and capacities during before and after exercise using Respirometer. 2. Determination of metabolic rate using Respirometer. 3. Estimation of heart rate, pulse rate and blood pressure changes during exercise using the Oscillometric technique. 4. Study of ECG and its evaluation in normal and pathological variations. 5. Evaluation of heart rate, blood pressure using ECG strip. 6. Measurement of muscular fatigue using Finger Ergograph. 7. Study of nitrogenous waste products of animals from different habitats. 8. Analysis of coelomic fluid of star fish.	**12 lab hours** **12 lab hours**

	Developmental Biology 1. Identification of developmental stages of chick embryo using HH classification. 2. In vitro culture of chick embryo. 3. Effect of proline / retinoic acid in early development of chick embryo (In vivo as well as in vitro). 4. Effect pesticides on the ossification process of chick embryo by dual staining method.	**12 lab hours**

	Ecology 1. Assessment of density, frequency and abundance of animals in a community using various techniques i.e. transect, quadrate etc. 2. Measurement of Productivity in ecosystems. 3. To study frequency of herbaceous species in a landscape and to compare the frequency distribution with Raunkiaer's standard frequency diagram. 4. To determine the biomass of a particular area. 5. Food web analysis and studies along with energy flow. 6. Decomposition of various organic matters and nutrient release mechanisms, quantification / role of arthropods and other micro-, and macrofauna in decomposition. 7. Biomagnification/Bioaccumulation analysis in ecosystems. 8. To study the biotic components of a water body. 9. Principles of GIS, GPS and Remote Sensing technology. 10.Interpretation (visual and automated) of remote sensing information for landscape differentiation. **Field Work** Faunistic survey around 1 km radius of his/ her residence during dawn of every weekends for at least 2 months (8 weeks) using Transect or Quadrangle method of two different fauna. Visit to some National Park / Sanctuary and Some University and Research Institution out side Goa (within 1000 km from Goa) for 5 -6 days including Journey period. *In unavoidable circumstances overnight field work will be replaced by extending the time period (from 8 weeks to 10 weeks of weekend faunistic survey). *Evaluation of the field work component will be based on weekly field note and final compiled field report during SEA.	**12 hours**
Pedagogy:	Practicals/ Mini projects/ Group Activities.	
Learning Outcome:	Practicals will give hands on training based on courses ZOC 201, 202, 203 & 204.	
References /Reading:	As mentioned under individual course ZOC 201, 202, 203 & 204.	

MOOCs for Credit Mobility Through SWAYAM portal for upcoming M.Sc. Part II Student in the year 2020 - 2021

Sr. No.	Title of the Course	Credit Equivalemt
1	Academic Writing	4
2	Principles of Downstream Techiques in Bioprocess	3
3	Introduction to Research	2
4	Introduction to Biostatistics	2
5	Introduction to Protemics	2
6	Wildlife Ecology	3
7	Biomedical Nanotechnology	1

Biomedical nanotechnology

By Prof. P. Gopinath | IIT Roorkee

Biomedical nanotechnology is a rapidly developing field, which includes a diverse collection of disciplines. The applications of nanotechnology are gaining overwhelming response in almost all the fields. Especially in healthcare sector, tremendous developments have been achieved. For example, cancer diagnosis and therapy, medical implants, tissue engineering etc. In the coming years, the developments in this field are expected to fluorish and lead to several life saving medical technologies and treatment methods. Thus, the main objective of this course is to impart knowledge on biomedical applications of nanotechnology.

INTENDED AUDIENCE : UG/PG students of Biotechnology/ Nanotechnology. PRE-REQUISITES : Basic knowledge in biology.

Biomedical Nanotechnology Promo

Learners enrolled: 1519

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SUMMARY

Course Status :	Upcoming
Course Type :	Elective
Duration :	4 weeks
Start Date :	17 Aug 2020
End Date :	11 Sep 2020
Exam Date :	17 Oct 2020
Enrollment Ends :	17 Aug 2020
Category :	Biological Sciences & Bioengineering Bioengineering
Level :	Undergraduate/Postgraduate This is an AICTE approved FDP course

COURSE LAYOUT

Week 1: Introduction to nano, Nano-biomimicry, Synthesis of nanomaterials by physical and chemical methods, Synthesis of nanomaterials by biological methods, Characterisation of nanomaterials.

Week 2 : DNA nanotechnology, Protein & glyco nanotechnology, Lipid nanotechnology, Bio-nanomachines, Carbon nanotube and its bio-applications.

Week 3: Nanomaterials for cancer diagnosis, Nanomaterials for cancer therapy, Nanotechnology in tissue engineering, Nano artificial cells, Nanotechnology in organ printing.

Week 4 : Nanotechnology in point-of-care diagnostics, Nanopharmacology & drug targeting, Cellular uptake mechanisms of nanomaterials, In vitro methods to study antibacterial and anticancer properties of nanomaterials, Nanotoxicology.

BOOKS AND REFERENCES

1. Malsch, N.H., “Biomedical Nanotechnology”, CRC Press. (2005).
2. Mirkin, C.A. and Niemeyer, C.M., “Nanobiotechnology II: More Concepts and Applications”, Wiley-VCH. (2007).
3. Kumar, C. S. S. R., Hormes, J. and Leuschner C., “Nanofabrication Towards Biomedical Applications:

Techniques, Tools, Applications, and Impact”, WILEY -VCH Verlag GmbH & Co. (2005).

4. Lamprecht, A., “Nanotherapeutics: Drug Delivery Concepts in Nanoscience”, Pan Stanford Publishing Pte. Ltd. (2009).
5. Jain, K.K., “The Handbook of Nanomedicine”, Humana press. (2008).

INSTRUCTOR BIO

Prof. P. Gopinath

IIT Roorkee

Prof. P. Gopinath is an Associate Professor in the Department of Biotechnology at Indian Institute of Technology (IIT) Roorkee, India. He received his B.Sc. degree in Microbiology and M.Sc. degree in Biotechnology from Bharathidasan University, India. He earned his Ph.D. in Biotechnology at Indian Institute of Technology Guwahati, India. He did his postdoctoral research at University of Rochester Medical Center, New York, USA. Currently his research group in nanobiotechnology laboratory is working on the development of various polymer based nanocarriers for the delivery of various anticancer agents including anticancer drugs, siRNA, genes etc. This group is also exploring the possibilities of various biocompatible imaging agents for cancer diagnosis. In order to realize the efcacy of such therapeutic and imaging agents, they are validating these systems in an articial scaffold which mimics the in vivo condition to the closest extent. He has published more than 60 research articles, 5 books and 6 bookchapters.

COURSE CERTIFICATE

The course is free to enroll and learn from. But if you want a certificate, you have to register and write the proctored exam conducted by us in person at any of the designated exam centres.

The exam is optional for a fee of Rs 1000/- (Rupees one thousand only).

Date and Time of Exams: **17 October 2020** Morning session 9am to 12 noon; Afternoon Session 2pm to 5pm.

Registration url: Announcements will be made when the registration form is open for registrations.

The online registration form has to be filled and the certification exam fee needs to be paid. More details will be made available when the exam registration form is published. If there are any changes, it will be mentioned then.

Please check the form for more details on the cities where the exams will be held, the conditions you agree to when you fill the form etc.

CRITERIA TO GET A CERTIFICATE

Average assignment score = 25% of average of best 3 assignments out of the total 4 assignments given in the course.

Exam score = 75% of the proctored certification exam score out of 100 Final score = Average assignment score + Exam score

YOU WILL BE ELIGIBLE FOR A CERTIFICATE ONLY IF AVERAGE ASSIGNMENT SCORE >=10/25 AND EXAM SCORE >= 30/75. If one of the 2 criteria is not met, you will not get the certificate even if the Final score >= 40/100.

Certificate will have your name, photograph and the score in the final exam with the breakup.It will have the logos of NPTEL and IIT Roorkee.It will be e-verifiable at nptel.ac.in/noc (http:/ nptel.ac.in/noc).

Only the e-certificate will be made available. Hard copies will not be dispatched.

Once again, thanks for your interest in our online courses and certification. Happy learning.

- NPTEL team

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X

Academic Writing

By Dr Ajay Semalty | HNB Garhwal University (A Central University) Srinagar Garhwal (Uttarakhand)

Number of Credits :-4

Myself, Dr Ajay Semalty, from HNB Garhwal University (A Central university) Srinagar Garhwal, Uttarakhand welcome you on behalf of our entire team. After the two successful run of the course in last two cycles, we are proud to present India's most popular SWAYAM MOOC which got maximum number of exam registration (among all the SWAYAM MOOCs) and has been listed in top 30 MOOCs worldwide (http:/ tiny.cc/pib27april2020). So far, more than 20000 learners across more than 85 countries have taken the advantage of the course.

In academic and research, who does not want the publications? In spite of being the vital requirement in academic & research career there is no comprehensive set up of learning academic writing in the knowledge

domain. This course aims to fill this gap by providing the fundamental knowledge required for effective and result oriented academic writing. It is a foundation course and the application of this knowledge completely depends on an individual learner and his or her area of research.

Objectives of Course

Upon completing the course, one would be able

1. To differentiate between various kind of academic writings.
2. To identify and avoid the plagiarism.
3. To practice the basic skills of performing quality literature review.
4. To practice the basic skills of research paper, review paper and thesis writing.
5. To target the research work to suitable journal and communicate for publication
6. To practice the Time and team management.
7. To practice digital writing or develop Open Educational Resources (OER).
8. To write research proposals, conference abstract and book chapters/ book proposals.

Target Group

Any student or learner who wants to learn the academic writing. The course shall be helpful for PG students, research scholars, young scientists and faculty members (of any discipline or subject) for their career growth.

Testimonials from learners

" . I was looking for such type of course for many years and finally, you fulfilled my wish to know more about research,

guidelines about research, plagiarism, open educational resources, paper writing, thesis writing and many such significant topics for a researcher to know and understand about the various aspects of research." - Dr Anil Patil

It is a great experience. Just like it is a face to face classroom learning. The course providers actually from science faculty even though any one can access in such a way they provided all the information. Their tagged notes to the video is very useful for those who may not interact in web classes. - G. Satyanarayana, Asst. Professor, English.

"The course is interesting, creating curiosity, enthusiasm, educative, stimulating for a professional career. It is useful for practicing teaching faculty, researcher, and professionals. The presentation and transcript are useful and interesting. The presentation is clear, complete and effective. The quiz questions are interesting and challenging."

- V.Chandra Sekhara Rao

Team AW

Dr Ajay Semalty
(Course Coordinator & Subject Matter Expert)

Dr Mona Semalty
(Co-Course Coordinator & Subject Matter Expert)

Prof Rajat Agrawal
(Subject Matter
Expert)

Mr Lokesh Adhikari
(Instructional Designer)

Pandavaas Creations Pvt.
Ltd. Production

Learners enrolled: 1493

J OIN (/update_profile_and_register?user_email=&raw_slug=/cec20_ge29&node_code=nd2)

S UMM ARY

Course Status :	Upcoming
Course Type :	Elective
Duration :	15 weeks
Start Date :	20 Jul 2020
End Date :	31 Oct 2020
Exam Date :	14 Nov 2020
Enrollment Ends :	31 Aug 2020
Category :	Multidisciplinary
Level :	Undergraduate/Postgraduate

COURSE LAYOUT

Course Duration 15 week

Credits : 04

Week 1

Academic & research writing: Introduction; Importance of academic writing; Basic rules of academic writing

Week 2

English in academic writing I & II; Styles of research writing

Week 3

Plagiarism: Introduction; Tools for the detection of plagiarism; Avoiding plagiarism

Week 4

Journal Metrics

Week 5

Author Metrics

Week 6

Literature review: Introduction, Source of literature; Process of literature review

Week 7

Online literature databases; Literature management tools

Week 8

Review Paper Writing, I & II

Week 9

Research paper writing I, II, III

Week 10

Referencing and citation; Submission and; Post submission

Week 11

Thesis Writing I, II & III

Week 12

Empirical Study I, II & III

Week 13

Challenges in Indian research & writing; Team management (mentor and collaborators); Time Management

Week 14

Research proposal writing; Abstract/ Conference Paper/ Book/ Book Chapter writing; OERs: basic concept and licenses

Week 15

Open Educational Resources (OERs) for learning & Research; OERs development I & II

BOOKS AND REFERENCES

Given in each modules' content.

INSTRUCTOR BIO

Dr Ajay Semalty

HNB Garhwal University (A Central University) Srinagar Garhwal (Uttarakhand)

M. Pharm. (Pharmaceutics), MBA (Operations Management); Ph. D., PDF Meijo University, Japan; Academic and research experience of 16 Yrs and 1 yr Industrial Experience; Completed 10 research projects funded by various agencies; Successfully developed and run two SWAYAM MOOCs (Academic Writing and Industrial Pharmacy I) with 80 hrs of Teaching Learning Materials including more than 40 hrs of video lectures; Contributed 4 e-modules for ARPIT course of GJU Science & technology Hisar; Published 74 papers, 6 books (including the best seller "Essentials of Pharmaceutical Technology" by Pharma Med Press), 2 patents (01 granted).

He has presented papers in more than 100 conferences; Highly cited researcher of the field (h index 23); Awarded Daiko Foundation Post-Doctoral Research Fellowship and invited by Meijo University, Nagoya, Japan as visiting scientist for research for FY 2011-12; Awarded with the prestigious national Research Award by UGC, New Delhi and Young Scientist Award of the year 2007 by Uttarakhand Council of Science & Technology (UCOST); Expert reviewer of Iceland Research Foundation Iceland; Israel Science Foundationn (ISF) Israel and Scientific Expert (REPRISE) for Ministry of Institution and University Research (MIUR), Italy.

Delivered more than 40 invited lectures (on Open Educational Resources (OERs), Academic writing, Nanoparticle research, Research methodology, Research ethics, Software in research, MOOC, blended/ flipped learning, research proposal writing, academic integrity, plagiarism etc.) in various training programs in Faculty Development Centers (FDCs), Human Resource Development Centers (HRDCs) and other institutions.

He is member of The Asian Council of Science Editors, APTI and IPA; Editorial Board Member and Peer reviewer of various national and International reputed journals; The University SWAYAM Coordinator of Garhwal University; Supervised 20 M. Pharm research projects; Research interest include cyclodextrin and lipid complexes, Small angle neutron scattering (SANS), nanoparticles, natural products for drug delivery like obesity and hair loss.

COURSE CERTIFICATE

30 Marks will be allocated for Internal Assessment (assignment/ discussion forum/ activity) and 70 Marks will be allocated for external proctored examination. 40 % minimum passing marks are needed in internal as well as external for being eligble for certificate.

 (https://swayam.gov.in/)  (https://swayam.gov.in/nc_details/NPTEL)

X

Wildlife Ecology

By Prof. Ankur Awadhiya | IIT Kanpur

Wildlife is an enamouring field for most of us. In my professional tenure, I've observed numerous people flocking to get a glimpse of the tiger, to get an opportunity of diving with the fishes, or to get access to a National Park or a Wildlife Sanctuary. And these experiences gets even more endearing when you get to know how the show is getting managed, how and why we regulate access, and also how we maintain grasslands and water bodies to keep the systems up and running. This course will cover one such aspect of wildlife management by providing an overview of the field of Ecology, and also how it is being used in the understanding and management of our wildlife resources. In this course, we'll use the casestudy approach with real-life examples from the field to get a better understanding of the field and its applications.

INTENDED AUDIENCE : Officers and staff of Forest departments, Studentsof Forestry, Wildlife conservation and allieddisciplines, Policymakers

PREREQUISITES : Has cleared 10+2 with science

INDUSTRY SUPPORT : Tourism industries, Education industries, Green energy industries, Renewable energy / materials industry

noc19-bt09-Wildlife Ecology-Introduction

Learners enrolled: 472

J O I N (https://swayam.gov.in/update_profile_and_register?user_email=&raw_slug=/noc20_bt38&node_code=nd1)

S UMMARY

Course Status :	Upcoming
Course Type :	Elective
Duration :	12 weeks
Start Date :	20 Jul 2020
End Date :	09 Oct 2020
Exam Date :	18 Oct 2020
Enrollment Ends :	27 Jul 2020
Category :	Biological Sciences & Bioengineering
Level :	Undergraduate/Postgraduate This is an AICTE approved FDP course

COURSE LAYOUT

Week 1 : Introduction

Week 2 : Ecological structure

Week 3 : Ecological interactions

Week 4 : Ecological energetics

Week 5 : Population Ecology

Week 6 : Community Ecology

Week 7 : Distribution & abundance

Week 8 : Management of threatened species

Week 9 : Human Ecology

Week 10: Ecology of change

Week 11: Applied Ecology

Week 12: Revision

BOOKS AND REFERENCES

Krebs, C. J. The experimental analysis of distribution and abundance. Ecology. New York: Harper and Row.2. Odum, E. P., & Barrett, G. W. Fundamentals of Ecology. Philadelphia: Saunders.3. Selected articles / papers as referred to in the lectures.

INSTRUCTOR BIO

Prof. Ankur Awadhiya

IIT Kanpur

Dr. Ankur Awadhiya (B. Tech IIT Kanpur 2009, Ph. D IIT Kanpur 2015, AIGNFA IGNFA Dehradun 2016, PGDAWM WII Dehradun 2018) is an IFS officer borne on the Madhya Pradesh cadre. His interests include photography, tourism, research, instrumentation and creative literary pursuits.

COURSE CERTIFICATE

- The course is free to enroll and learn from. But if you want a certificate, you have to register and write the proctored exam conducted by us in person at any of the designated exam centres.
- The exam is optional for a fee of Rs 1000/- (Rupees one thousand only).
- **Date and Time of Exams: 18th October, 2020**, Morning session 9am to 12 noon; Afternoon Session 2pm to 5pm
- Registration url: Announcements will be made when the registration form is open for registrations.
- The online registration form has to be filled and the certification exam fee needs to be paid. More details will be made available when the exam registration form is published. If there are any changes, it will be mentioned then.
- Please check the form for more details on the cities where the exams will be held, the conditions you agree to when you fill the form etc.

CRITERIA TO GET A CERTIFICATE:

- Average assignment score = 25% of average of best 8 assignments out of the total 12 assignments given in the course.
- Exam score = 75% of the proctored certification exam score out of 100
- Final score = Average assignment score + Exam score

YOU WILL BE ELIGIBLE FOR A CERTIFICATE ONLY IF AVERAGE ASSIGNMENT SCORE >=10/25 AND EXAM SCORE >= 30/75.

- If one of the 2 criteria is not met, you will not get the certificate even if the Final score >= 40/100.
- Certificate will have your name, photograph and the score in the final exam with the breakup.It will have the logos of NPTEL and IIT Kanpur. It will be e-verifiable at nptel.ac.in/noc (http://nptel.ac.in/noc)
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X

Introduction to Biostatistics

By Prof. Shamik Sen | IIT Bombay

Observations from biological laboratory experiments, clinical trials, and health surveys always carry some amount of uncertainty. In many cases, especially for the laboratory experiments, it is inevitable to just ignore this uncertainty due to large variation in observations. Tools from statistics are very useful in analyzing this uncertainty and filtering noise from data. Also, due to advancement of microscopy and molecular tools, a rich data can be generated from experiments. To make sense of this data, we need to integrate this data a model using tools from statistics. In this course, we will discuss about different statistical tools required to

(i) analyze our observations,

(ii) design new experiments, and

(iii) integrate large number of observations in single unified model.

INTENDED AUDIENCE : BE Biotech/Biosciences/Bioengineering,MSc Biotech/Bio sciences/Bioengineering, PhD Biotech/Biosciences/Bioengineering. It is taught as a core course for M. Tech Biomedical Engineering students at IITBombay.

PRE-REQUISITES : Basic knowledge of 12th standard mathematics is suficient.

INDUSTRY SUPPORT : Biotech companies, pharma companies and omics companies may be interested in this course.

Prof Shamik Sen

Learners enrolled: 891

JOIN (/update_profile_and_register?user_email=&raw_slug=/noc20_bt28&node_code=nd1)

SUMMARY

Course Status :	Upcoming
Course Type :	Elective
Duration :	8 weeks
Start Date :	20 Jul 2020
End Date :	11 Sep 2020
Exam Date :	27 Sep 2020
Enrollment Ends :	27 Jul 2020
Category :	Biological Sciences & Bioengineering
Level :	Undergraduate/Postgraduate This is an AICTE approved FDP course

COURSE LAYOUT

Week 1 :

Lecture 1. Introduction to the course

Lecture 2. Data representation and plotting

Lecture 3. Arithmetic mean

Lecture 4. Geometric mean

Lecture 5. Measure of Variability, Standard deviation

Week 2 :

Lecture 6. SME, Z-Score, Box plot

Lecture 8. Kurtosis, R programming

Lecture 9. R programming

Lecture 10. Correlation

Week 3 :

Lecture 11. Correlation and Regression

Lecture 12. Correlation and Regression Part-II

Lecture 13. Interpolation and extrapolation

Lecture 14. Nonlinear data fitting

Lecture 15. Concept of Probability: introduction and basics

Week 4 :

Lecture 16. counting principle, Permutations, and Combinations

Lecture 17. Conditional probability

Lecture 18. Conditional probability and Random variables

Lecture 19. Random variables, Probability mass function, and Probability density function

Lecture 20. Expectation, Variance and Covariance

Week 5 :

Lecture 21. Expectation, Variance and Covariance Part-II

Lecture 22. Binomial random variables and Moment generating function

Lecture 23. Probability distribution: Poisson distribution and Uniform distribution Part-I

Lecture 24. Uniform distribution Part-II and Normal distribution Part-I

Lecture 25. Normal distribution Part-II and Exponential distribution

Week 6 :

Lecture 26. Sampling distributions and Central limit theorem Part-I

Lecture 27. Sampling distributions and Central limit theorem Part-II

Lecture 28. Central limit theorem Part-III and Sampling distributions of sample mean

Lecture 29. Central limit theorem - IV and Confidence intervals

Lecture 30. Confidence intervals Part- II

Week 7 :

Lecture 31. Test of Hypothesis - 1

Lecture 32. Test of Hypothesis - 2 (1 tailed and 2 tailed Test of Hypothesis, p-value)

Lecture 33. Test of Hypothesis - 3 (1 tailed and 2 tailed Test of Hypothesis, p-value)

Lecture 34. Test of Hypothesis - 4 (Type -1 and Type -2 error)

Lecture 35. T-test

Week 8 :

Lecture 36. 1 tailed and 2 tailed T-distribution, Chi-square test

Lecture 37. ANOVA - 1

Lecture 38. ANOVA - 2

Lecture 39. ANOVA - 3

Lecture 40. ANOVA for linear regression, Block Design

BOOKS AND REFERENCES

1. Introduction to Probability & Statistics - Medenhall, Beaver, Beaver 14th Edition

2. Introduction to Probability and statistics for engineers and scientists, S M Ross, 3rd Edition

INSTRUCTOR BIO

Prof. Shamik Sen

IIT Bombay

Prof. Shamik Sen joined IIT Bombay in July 2010 as an Assistant Professor in the Department of Biosciences and Bioengineering. Dr. Sen earned a B.E. in Mechanical Engineering from Jadavpur University, Kolkata, and a M. Tech in Mechanical Engineering from IIT Kanpur. He then completed his PhD in Mechanical Engineering from University of Pennsylvania, where he worked in the area of mechanobiology.He is currently working in the area of mechanobiology where he is integrating mechanics and biology for probing stem cell biology and cancer cell biology. He is combining experiments with simulations for addressing his research questions.

COURSE CERTIFICATE

The course is free to enroll and learn from. But if you want a certificate, you have to register and write the proctored exam conducted by us in person at any of the designated exam centres.

The exam is optional for a fee of Rs 1000/- (Rupees one thousand only).

Date and Time of Exams: **27 September 2020** Morning session 9am to 12 noon; Afternoon Session 2pm to 5pm.

Registration url: Announcements will be made when the registration form is open for registrations.

The online registration form has to be filled and the certification exam fee needs to be paid. More details will be made available when the exam registration form is published. If there are any changes, it will be mentioned then.

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CRITERIA TO GET A CERTIFICATE

Average assignment score = 25% of average of best 6 assignments out of the total 8 assignments given in the course. Exam score = 75% of the proctored certification exam score out of 100

Final score = Average assignment score + Exam score

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Only the e-certificate will be made available. Hard copies will not be dispatched.

Once again, thanks for your interest in our online courses and certification. Happy learning.

- NPTEL team

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Helpline : 1 800 121 9025 | email : support@swayam.gov.in

Introduction To Proteomics

By Prof. Sanjeeva Srivastava | IIT Bombay

This course introduces to the basic biology of proteins and the new advanced science called as proteomics which aims to look into the protein properties from a global perspective, i.e., not undertaking one protein at a time, but an entire set of proteins in the milieu. The course will cover in detail the two major aspects of proteomics i.e., Gel-based proteomics and Mass spectrometry-based proteomics. The gel-based module will cover different techniques like SDS-PAGE, 2-DE, 2D-DIGE etc. These techniques had a major contribution in transition from protein chemistry to proteomics. Mass spectrometry, on the other hand, is an advanced analytical technique for accurate mass measurement. In this module, we will discuss the basics of mass spectrometry, sample preparations, liquid chromatography, hybrid mass spectrometers and quantitative proteomics techniques such as iTRAQ, SILAC and TMT using mass spectrometry. The course will also provide the basic knowledge about sample preparation, mass spectrometry workflow, different chromatography technologies and quantitative proteomics.

INTENDED AUDIENCE : It would be applied to B.Sc., M.Sc. and MS.

PREREQUISITES : Any B.Sc. Or M.Sc.The target audiences of this course are required to have a basic introduction to biology.

Course Intro Proteomics

Learners enrolled: 458

JOIN (/update_profile_and_register?user_email=&raw_slug=/noc20_bt20&node_code=nd1)

SUMMARY

Course Status :	Upcoming
Course Type :	Elective
Duration :	8 weeks
Start Date :	17 Aug 2020
End Date :	09 Oct 2020
Exam Date :	17 Oct 2020
Enrollment Ends :	17 Aug 2020
Category :	Biological Sciences & Bioengineering Biosciences

Level :

Undergraduate/Postgrad

uate This is an AICTE approved FDP course

COURSE LAYOUT

Week 1 : Basics of Proteins and Proteomics

Lecture 1 : Introduction to amino acids

Lecture 2 : Introduction to Proteins

Lecture 3 : Protein folding & misfolding

Lecture 4 : Introduction to Proteomics

Lecture 5 : Lab session – Protein-protein interaction using label-free biosensors

Week 2 : Gel-based proteomics

Lecture 6: Sample preparation and pre-analytical factors

Lecture 7 : Sample preparation: Pre-analytical factors

(contd.)

Lecture 8 : Sample preparation: Protein extraction and quantification

Lecture 9 : One-dimensional electrophoresis

Lecture 10 : Introduction to 2-DE

Week 3 : Two-dimensional gel electrophoresis (2-DE)

Lecture 11 : 2-DE: Second dimension, staining & destaining

Lecture 12 : 2-DE: Gel analysis

Lecture 13 : 2-DE Applications

Lecture 14 : 2-DE Applications (contd.) & Challenges

Lecture 15 : Lab session - Protein/peptide pre-fractionation using OFFGEL FRACTIONATOR & data analysis

Week 4 : Difference in gel electrophoresis (DIGE) & Systems Biology

Lecture 16 : 2D-DIGE: Basics

Lecture 17 : 2D-DIGE: Data analysis

Lecture 18 : 2D-DIGE: Applications

Lecture 19 : Systems biology and proteomics – I

Lecture 20 : Systems biology and proteomics - II

Week 5 : Basics of mass spectrometry

Lecture 21 : Fundamentals of mass

spectrometry

Lecture 22 : Chromatography technologies

Lecture 23 : Liquid chromatography

Lecture 24 : Mass spectrometry: Ionization sources

Lecture 25 : Mass spectrometry: Mass analyzers

Week 6 : Basics of mass spectrometry and sample preparation

Lecture 26 : MALDI sample preparation and analysis

Lecture 27 : Hybrid mass spectrometry configurations

Lecture 28 : Lab session - Demonstration of Q-TOF MS technology

Lecture 29 : In-gel & in-solution digestion

Lecture 30 : Lab session - Sample preparation: tissue sample preservation technology

Week 7 : Quantitative proteomics

Lecture 31 : Introduction to quantitative proteomics

Lecture 32 : SILAC: In vivo labelling

Lecture 33 : iTRAQ: In vitro labelling Lecture 34 : TMT: In vitro labelling

Lecture 35 : Quantitative proteomics data analysis

Week 8 : Advancement in Proteomics

Lecture 36 : Proteomics applications

Lecture 37 : Challenges in proteomics

Lecture 38 : OMICS and translational research

Lecture 39 : Lab session – Targeted proteomics using triple quadrupole mass spectrometry

Lecture 40 : Lab session – Targeted proteomics: multiple reaction monitoring

BOOKS AND REFERENCES

Nil

INSTRUCTOR BIO

Prof. Sanjeeva Srivastava

IIT Bombay

Prof. Sanjeeva Srivastava Dr. Sanjeeva Srivastava is a Professor and group head of proteomics laboratory at the Indian Institute of Technology, Bombay. He obtained his Ph.D. from the University of Alberta and post-doc from the Harvard Medical

School in the area of proteomics, stress physiology and has specialized expertise in applications of data enabled sciences in global health, developing country and resource limited settings. He joined IIT Bombay in 2009 as an Assistant Professor and currently working as Professor. Current research in his group centers on biomarker and drug target discovery and deciphering the protein interaction networks in complex human diseases (gliomas) and infectious diseases (malaria) using high throughput proteomics, protein microarrays and mass spectrometry. Dr. Srivastava is an active contributor to global proteomics science and innovation. He serves on the Executive Council of Human Proteome Organization (HUPO) and Proteomics Society, India (PSI). He has organized three successful international conferences & workshops at IIT Bombay PSI- 2014, Targeted Proteomics International Symposium in 2015 and 2018. He has published four special issues as editor, Proteomics in India for Journal of Proteomics; Proteomics Research in India for Nature India, Protein Arrays for Proteomics and Neglected Tropical Infectious Diseases for Proteomics Clinical Applications. Having an extensive teaching experience at IITB and experience of conducting proteomics courses at CSHL, New York provided him with the background to increase proteomics education for the global community. One of his special contributions has been the development of e-

learning resources (MOOC mass spectrometry and interactomics courses; Virtual Proteomics Laboratory). He has made first ever proteomics documentaries Proteomics: Translating the Code of Life and Human Proteome Project (HPP). He has directed HUPO Perspective in Proteomics video interview series, which is hosted on HUPO website. Recently we have signed a MOU on clinical proteogenomics cancer research with National Cancer Institute, along with Tata Memorial Centre and India has now become 12th country to join the International Cancer Proteogenome Consortium (ICPC). Dr. Srivastava continues to develop proteomics & omics science and innovation together with and for the next generation of keen students, researchers and the research and education commons in Asia and global OMICS community. Click here to view Faculty Profile:

http:**/** www.bio.iitb.ac.in/~sanjeeva/ About the Instructor: https:**/** youtu.be/sb4faypvWwk

COURSE CERTIFICATE

The course is free to enroll and learn from. But if you want a certificate, you have to register and write the proctored exam conducted by us in person at any of the designated exam centres.

The exam is optional for a fee of Rs 1000/- (Rupees one thousand only).

Date and Time of Exams: **17 October 2020** Morning session 9am to 12 noon; Afternoon Session 2pm to 5pm.

Registration url: Announcements will be made when the registration form is open for registrations.

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CRITERIA TO GET A CERTIFICATE

Average assignment score = 25% of average of best 6 assignments out of the total 8 assignments given in the course. Exam score = 75% of the proctored certification exam score out of 100

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YOU WILL BE ELIGIBLE FOR A CERTIFICATE ONLY IF AVERAGE ASSIGNMENT SCORE >=10/25 AND EXAM SCORE >= 30/75. If one of the 2 criteria is not met, you will not get the certificate even if the Final score >= 40/100.

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Only the e-certificate will be made available. Hard copies will not be dispatched.

Once again, thanks for your interest in our online courses and certification. Happy learning.

- NPTEL team

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Introduction to Research

By Prof. Prathap Haridoss | IIT Madras

Large numbers of students are actively considering and taking up research and associated higher studies. This course aims to introduce students to the important aspects of research. The intent of the course is to make students aware of the details associated with formal research and to help students overcome common misconceptions that may be present in their minds. By going through this course, students are likely to be able to take up research activities in a more systematic and formal manner right from the beginning.

INTENDED AUDIENCE : Students of ME/MTech/MS/MSc/PhD can benefit.

PRE-REQUISITES : Students who have completed undergraduate studies (in Engineering or Science) will be in a better position to benefit from this course

Introduction to Research

Learners enrolled: 1223

JOIN (/update_profile_and_register?user_email=&raw_slug=/noc20_ge22&node_code=nd1)

SUMMARY

Course Status :	Upcoming
Course Type :	Elective
Duration :	8 weeks
Start Date :	17 Aug 2020
End Date :	09 Oct 2020
Exam Date :	18 Oct 2020
Enrollment Ends :	17 Aug 2020
Category :	Multidisciplinary Faculty Domain for Newly Joined

Level : Postgraduate

This is an AICTE approved FDP course

COURSE LAYOUT

Week 1 : A group discussion on what is research; Overview of research;

Week 2 : Literature survey , Experimental skills;

Week 3 : Data analysis, Modelling skills;

Week 4 : Technical writing; Technical Presentations; Creativity in Research

Week 5 : Creativity in Research; Group discussion on Ethics in Research

Week 6 : Design of Experiments

Week 7 : Intellectual Property

Week 8 : Department specific research discussions

BOOKS AND REFERENCES

Nil

INSTRUCTOR BIO

Prof. Prathap Haridoss

IIT Madras

Prof. Prathap Haridoss is a Professor in the Department of Metallurgical and Materials Engineering at IIT Madras. He works in the areas of Fuel Cell and Carbon nanomaterials. He has a B.Tech in Metallurgical Engineering from IIT Madras, and a PhD in Materials Science and Engineering from the University of Wisconsin-Madison, USA. Before he joined as a faculty at IIT Madras, he served as a Senior Scientist at Plug Power, a Fuel Cell company in New York. He has 3 US patents, several International Journal publications, and has published a book titled “Physics of Materials, Essential Concepts of Solid State Physics”

COURSE CERTIFICATE

The course is free to enroll and learn from. But if you want a certificate, you have to register and write the proctored exam conducted by us in person at any of the designated exam centres.

The exam is optional for a fee of Rs 1000/- (Rupees one thousand only).

Date and Time of Exams: **18 October 2020** Morning session 9am to 12 noon; Afternoon Session 2pm to 5pm.

Registration url: Announcements will be made when the registration form is open for registrations.

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Once again, thanks for your interest in our online courses and certification. Happy learning.

- NPTEL team

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Principles Of Downstream Techniques In Bioprocess

By Prof. Mukesh Doble | IIT Madras

The course covers the fundamentals, and design concepts of various down stream purification steps (unit operations) involved in a biochemical process. Down stream process is required to take a crude product from a fermentor or a bioreactor and purify it to the desired level. Hence it may involve solids, liquid and gas processing.The course covers cell breakage and recovery of intracellular material, Isolation of solids, Product recovery, Product enrichment/purification, Product polishing and finishing. This course is suitable for students pursuing their biotechnology, bioprocess engineering or other allied fieldThis course is also suitable for chemical engineers who would like to learn about separation techniques in biotechnology industries. The course will consist of lectures and solving problems. Problems will relate to design, estimating operating conditions and optimization of the process.

PREREQUISITES :Basics of biochemical engineering and thermodynamics

introduction to downstream processing

Learners enrolled: 210

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SUMMARY

Course Status :	Upcoming
Course Type :	Elective
Duration :	12 weeks
Start Date :	20 Jul 2020
End Date :	09 Oct 2020
Exam Date :	17 Oct 2020
Enrollment Ends :	27 Jul 2020
Category :	Biological Sciences & Bioengineering Bioprocesses

Level :

Undergraduate/Postgrad

uate This is an AICTE approved FDP course

COURSE LAYOUT

Week 1 : Lec-01 Introduction

Lec-02 Mass balance, Heat Balance, flow sheet

Lec-03 Costing

Week 2 : Lec-04 Costing (continued), Physical and chemical principles in

Downs stream

Lec-05 Problems in Mass balance, flow sheet

Lec-06 Cell Breakage

Week 3 : Lec-07 Cell Breakage (continued)

Lec-08 Solid Liquid Separation

Lec-09 Solid Liquid Separation

(continued)

Week 4 : Lec-10 Solid Liquid

separation-problems

Lec-11 Pre-treatment and

Filters Lec-12 Adsorption

Week 5 : Lec-13 Adsorption

(continued)

Lec-14 Adsorption (continued)

Lec15 Adsorption

(continued)

Week 6 : Lec-16 Liquid-Liquid Extraction

Lec-17 Liquid-Liquid extraction

(continued) Lec-18 Liquid-Liquid

extraction (continued)

Week 7 : Lec-19 Liquid-Liquid extraction (continued)

Lec-20 Reversed micellar and aqueous two phase

extraction Lec-21 Membranes

Week 8 : Lec-22 Membranes

(continued) Lec-23

Membranes (continued)

Lec-24 Membranes

(continued)

Week 9 : Lec-25 Precipitation

Lec-26

Chromatography

Lec-27 Chromatography

(continued) Week 10 : Lec-28

Chromatography (continued)

Lec-29 Chromatography

(continued) Lec-30

Chromatography (continued)

Week 11 : Lec-31 Chromatography

(continued) Lec-32

Chromatography (continued) Lec-

33 Crystallisation

Week 12 : Lec-34 Drying

Lec-35 Drying and Distillation

Lec-36 Future trends, Summary of the course

BOOKS AND REFERENCES

1. Belter, P.A. and Cussler, E.L. Hu, W.S (1988), Bioseparation: Downstream processing for Biotechnology, Wiley, New York.
2. Ladisch, M.R., (2001), Bioseparation Engineering: Principles, Practice and Economics, Wiley, Interscience.

INSTRUCTOR BIO

Prof. Mukesh Doble

IIT Madras

Mukesh Doble: Professor at the department of Biotechnology at IIT Madras. Has previously worked in Imperial chemical

Industries(ICI) and General Electric(GE) for 20 years . Areas of research are Biomaterials, Biopolymers

and Drug design. Published 270 papers and 10 books and filed 10 patents (including two US). Has

delivered on line video courses in Downstream processes and Biostatistics.

COURSE CERTIFICATE

The course is free to enroll and learn from. But if you want a certificate, you have to register and write the proctored exam conducted by us in person at any of the designated exam centres.

The exam is optional for a fee of Rs 1000/- (Rupees one thousand only).

Date and Time of Exams: **17 October 2020** Morning session 9am to 12 noon; Afternoon Session 2pm to 5pm.

Registration url: Announcements will be made when the registration form is open for registrations.

The online registration form has to be filled and the certification exam fee needs to be paid. More details will be made available when the exam registration form is published. If there are any changes, it will be mentioned then.

Please check the form for more details on the cities where the exams will be held, the conditions you agree to when you fill the form etc.

CRITERIA TO GET A CERTIFICATE

Average assignment score = 25% of average of best 8 assignments out of the total 12 assignments given in the course.

Exam score = 75% of the proctored certification exam score out of

100 Final score = Average assignment score + Exam score

YOU WILL BE ELIGIBLE FOR A CERTIFICATE ONLY IF AVERAGE ASSIGNMENT SCORE >=10/25 AND EXAM SCORE >= 30/75. If one of the 2 criteria is not met, you will not get the certificate even if the Final score >= 40/100.

Certificate will have your name, photograph and the score in the final exam with the breakup.It will have the logos of NPTEL and IIT Madras .It will be e-verifiable at nptel.ac.in/noc (http:**/** nptel.ac.in/noc).

Only the e-certificate will be made available. Hard copies will not be dispatched.

Once again, thanks for your interest in our online courses and certification. Happy learning.

NPTEL team

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of India)

ANNEXURE I

Semester –III Credits: 3+1(75+25 marks)

SEC 1 : Statistical Methods

Theory (40 hours)

1. **Introduction – Meaning and Scope**: Defination of Statistics, Importance and scope of Statistics, Limitations of Statistics, Distrust of Statistics. **(1hours)**
2. **Correlation and Regression Analysis**: Introduction. Karl Pearson's coefficient of Correlation, Rank correlation method .Regression Analysis. **(6 hours).**
3. **Theory of Probability**:Introduction ,Mathematical probability, Statistical probability, Axiomatic probability, Addition Theorem of probability.(Proof Omitted),Multiplication theorem of probability. Pair wise and mutual independence, Inverse probability-Baye's Theorem **(5 hours).**
4. **Random Variables**: Probability Distributions and Mathematical Expectation : Random Variable, Probability distribution of a Discrete Random Variable, Probability Distribution of a Continuous Random Variable, Mathematical Expectations. **(4 hours)**
5. **Theoretical Distributions:** Binomial distribution, Poisson Distribution, Normal Distribution**.** **(5 hours)**
6. **Testing of Hypothesis:** Interval Estimation, Testing of Hypothesis. **(3 hours)**
7. **Large sample tests:** Introduction, Sampling of Attributes, Sampling of Variables. **(3 hours)**
8. **Parametric Tests:** Student's 't' distribution, ANOVA, Post-hoc analysis **.** **(8 hours)**
9. **Non –Parametric tests:** Chi Square test, Mann-Whitney test, Kruskal walli's test **(5 hours)**

List of Practicals on Statistical Techniques: (each practical is of 2 hours)

(Problem solving and verifying using ***R or any other free software*****)**

1) Compute Correlation using Karl Pearson's coefficient of Correlation and Rank correlation method.
2) Finding Regression equations using datasets.
3) Finding Probability using Addition theorem of Probability, Multiplication theorem of Probability and Baye's theorem.
4) Finding probability using Mathematical Expectations.
5) Finding probability using Binomial Distribution and Poisson Distribution for discrete data.
6) Finding Probability using Normal Distribution for continuous data.
7) Testing of hypothesis for single mean and difference of means using 't-test' and paired 't-test'.
8) Testing of hypothesis for more than two means using ANOVA.
9) Testing of hypothesis regarding independence of attributes using Chi square test.
10) Testing the hypothesis stating that the k independent samples have been drawn from the populations which have identical distributions using Kruskal Walli's test.

Semester – IV Credits: 3+1 (75+25 marks)

SEC 2: Analytical Geometry

Theory (44 hours)

1. **Metric Properties on the Plane.** (3 hours)
2. **Straight lines in the Plane.** (3 hours)
3. **Circles in Plane.** (4 hours)
4. **Conics in the Plane and its Plane sections.** (8 hours)
5. **Classification of Conics.** (2 hours)
6. **Polar Co-ordinate System.** (2 hours)
7. **Co-ordinates in 3-space**. (1 hours)
8. **Plane in 3-space.** (3 hours)
9. **Lines in 3-space.** (3 hours)
10. **Transformation of Co-ordinates**. (2 hours)
11. **Sphere** .(4 hours)
12. **Cones**. (3 hours)
13. **Cylinder**. (2 hours)
14. **The Conicoid**. (4 hours)

List of Practicals on Analytical Geometry (Problem solving and verifying using GEOGEBRA)

(each practical is of 2 hours)

1) Reducing the equation using translation & rotation.
2) Finding the Pole and polar of circle.
3) Finding the focus, directrix, axes, latus rectum of Parabola, Ellipse and Hyperbola.
4) Tracing of second degree conics.
5) Verifying whether the given second degree equation represent a pair of planes, finding the angle between the two lines.
6) Finding the distance between straight line and point, two straight lines, and straight line and plane.
7) Tracing of conicoids.
8) Finding the plane sections of sphere, Finding the vertex of cone.

Annexture II

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The following two courses will together cover Algebra syllabus

(1) **Course Title: Introduction to Abstract Group Theory**;
NPTEL
Course Coordinator: Prof Krishna Hanumanthu, CMI
Duration: 8 weeks
Status: Completed Course

Modules/Lectures:
Week 1: Motivational examples of Groups
Week 2: Subgroups; group homomorphisms and examples; Properties of homomorphisms
Week 3: Group Isomorphisms; Normal subgroups; Equivalent relations
Week 4: Quotient groups; Isomorphism Theorems
Week 5: Cauchy's Theorem; Symmetric groups
Week 6: Permutations; Alternating groups; Group actions
Week 7: Orbits and stabilizers; Caley's Theorem; Class equations
Week 8: Group actions on subsets; Syllow's Theorems

(2) **Course Title: Introduction to Rings and Fields**;
NPTEL
Course Coordinator: Prof Krishna Hanumanthu, CMI
Duration: 8 weeks
Status: Completed Course

Modules/Lectures:
Week 1: Introduction, definitions and examples of Rings; Polynomial rings
Week 2: Homomorphisms; Kernel; Ideals
Week 3: Quotient Rings; Isomorphism theorem; Prime ideals; Maximal Ideals; Integral domains
Week 4: Existence of maximal ideals; Field of fractions; Noetherian rings
Week 5: Hilbert Basis Theorem; Irreducible, prime elements; PID; UFD
Week 6: Gauss Lemma; $\mathbb{Z}[X]$ is a UFD; Eisenstein criteria
Week 7: Field extensions; Degree of field extensions; Algebraic elements form a field; Field homomorphism
Week 8: Splitting Fields; Finite fields

This course is on Complex Analysis

(3) **Course Title: Complex Analysis**;

Course Coordinator: Prof. Pranav Haridas, Kerala School of Mathematics
Duration: 12 weeks

Modules/Lectures:

Week 1: Construction and algebra of the complex numbers
Week 2: Geometry of the complex numbers
Week 3: Complex differentiation and power series, Convergence of power series
Week 4: Differentiability and the Cauchy-Riemann equations, Maximum principle
Week 5: Integration along a contour, Integration in rectifiable curves
Week 6: The fundamental theorem of calculus, Integration by parts
Week 7: Homotopy, Cauchy's theorem
Week 8: Cauchy integral formula, Analytic continuation,
Week 9: Cauchy's inequalities, Uniform limit of holomorphic functions
Week 10: Winding number, General Cauchy integral formula
Week 11: Singularities of a holomorphic function, Laurent series
Week 12: The residue theorem, Argument principle, Rouche's theorem

Course Status :	Upcoming
Duration :	12 weeks
Start Date :	20 Jul 2020
End Date :	09 Oct 2020
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(4) **COURSE TITLE:** Linear Algebra (Completed course)

NPTEL

Course Coordinator: Dr. K.C. Sivakumar (IIT Madras)

Duration: 51 lectures

COURSE PLAN

Module 1: System of Linear equations

Module 2: Vector Spaces

Module 3: Basis and Dimension

Module 4: Linear Transformations

Module 5: Matrix of a linear transformation

Module 6: The dual Space

Module 7: Eigen values and Eigen vectors

Module 8: Invariant Subspaces and Triangulability

Module 9: Direct Sum Decomposition

Module 10: Primary and cyclic decomposition theorems

Module 11: Inner Product Spaces

Module 12: Best approximation

Module 13: Adjoint of a linear operator

Module 14: Self-adjoint, normal and unitary operator

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(5) **COURSE TITLE:** Ordinary and Partial Differential Equations and Applications

NPTEL

Course Coordinator: Dr. D.N. Pandey, Dr. P.N. Agrawal (IIT Roorkee)

Duration: 29 Lectures

COURSE PLAN

Unit 7: Origins and classification of first order PDE, Initial value problems for quasi-linear first order equations, existence and uniqueness of solutions, surfaces orthogonal to a given system of surfaces.

Unit 8: Non-linear PDE of first order, Cauchy method of Characteristics-I, Cauchy method of Characteristics-II, Compatible systems of first order equations, Charpits method-I.

Unit 9: Charpits method-II, second order PDE with variable coefficients, Classsification and Cannonical form of second order PDE-I, Classsification and Cannonical form of second order PDE-II, Classification and characteristic curves of second order PDEs.

Unit 10: Review of Integral Transforms-I, Review of Integral Transforms-II, Review of Integral Transforms-III, Laplace Equation-I, Laplace Equation-II.

Unit 11: Laplace Equation-III, Laplace and Poisson Equations, One-dimensional wave equation and its solution-I, One-dimensional wave equation and its solution-II, One-dimensional wave equation and its solution-III.

Unit 12: Two-dimensional wave equation and its solution-I, Solution of Non-homogeneous wave equation, Solution of homogeneous diffusion equation-I, Solution of homogeneous diffusion equation-II, Duhamel's Principle.

(6) Course Title: INTRODUCTORY COURSE IN REAL ANALYSIS
Instructor Name : P D SRIVASTAVA (lIT Kharagpur, Mathematics)

COURSE DURATION : Jan-Apr 2017 CORE / ELECTIVE : Core- UG / PG:
PRE-REQUISITES : None

INTENDED AUDIENCE : UG and PG students of Mathematics, lst and 2nd year B. Tech students.
INDUSTRIES APPLICABLE TO : All Universitics. IIT s. IISc & IISER

COURSE OUTLINE : This is a basic course in Real Analysis which is a back bone of any course on pure & applied Mathematics and Statistics.

ABOUT INSTRUCTOR : Prof. P.D.Srivastava is a Professor (in HAG scale) in the department of Mathematics at IIT Kharagpur. Professor Srivastavahas 36 years of teaching and research experience. He has taught many PG and UG courses such as Mathematics, and for B.Tech. students ,Real analysis, complex analysis, functional analysis, measure theory, sequence space etc. are also taught by him fot undergraduate and post graduate students of integrated courses in Mathematics. Prof. Srivastava has supervised so far' l3 students for their PhD degrees and approx. 50 students for M Sc. projects. He has more than 65 research publications in national and international journal of high repute. Professor Srivastava's main research interest is Functional Analysis, in particular, Operator theory and sequence spaces. He has also worked in fuzzy sequence spaces and Cryptography.

COURSE PLAN
Week l: Finite, countable and uncountable sets-3 lectures. Metric Space, Open set, Closed set, Lirnit point, Closure of a set- 3 lectures

Week2:Ordered set, Least upper bound,greatest lower bound-2 lectures Open cover,compact set and some properties of compact set- 2 lectures
Heine-Borel theorem- I lecture. Weierstrass Theorem, connected Set- I lecture

Week 3:Limit of sequences of real number - 2 lectures. Some important limits, Ratio test. Cauchy limit theorem - 4 lectures

Week 4:Some theorems on limit & Bolzano Weierstrass theorem - 2 lectures theorems on convergent & divergent sequences- 2 lectures.
Cauchy sequence & its properties- 2 lectures

Week 5:Infinite series of real numbers - 2 lectures, Comparison lest for series, Absolutely convergent and conditional convergent series – 2 lectures.
Some test for convergence of series- 2 lectures

Week 6:Raabe's Test & its application - I lecture. Limit of functions, cluster point - 3 lectures

Week 7:Limit theorems for functions - 4 lectures

Week 8:Continuity of functions - 2 lectures. Properties of continuous functions & composition of continuous functions - 2 lectures

Week 9:Boundedness theorem, Bolzano theorem- 2 lectures. Uniform & absolute continuity -2 lectures. Type of discontinuities - 2 lectures

Week 10:Differentiability of functions of real variables - 2 lectures. Mean value theorems - 2 lectures.

Application of derivatives , mean valuetheorems & Darboux theorem - 2 lectures
Week l1:L'Hospital rules, indeterminate forms. Taylor's theorem - 4 lectures. Riemann and Riemann-Stieltjes integrals- 2 lectures

Week l2:Existance of Riemann and Riemann-Stieltjes integrals - 2 lectures Properties of Riemann-Stieltjes inlegral - 2 lectures.
Classes of Riemann integrable functions, monotonic functions, step functions - 2 lectures

(7) **FUNCTIONAL ANALYSIS- Video Course** (Available on you tube.)

SWAYAM-NPTEL(Completed Course)

Course Co-ordinator: Prof.P.D. Srivastava

Department of Mathematics, IIT Kharagpur

Pre-requisites: Calculus & Linear Algebra

Course Outline

It is a first level course on Functional Analysis. The motto is to familiarize the students with basic concepts, principles and methods of Functional Analysis and its Applications.

CONTENTS: Metric spaces with examples, Complete Metric spaces, Separable Metric spaces, Compact sets, Normed and Banach spaces, Convergence, Bounded linear functionals and operators, Dual spaces, Reflexive spaces, Adjoint operators, Inner product spaces and Hilbert spaces with examples, Projection theorem, Orthonormal sets and sequences, Total Orthonormal sets, Riesz Reprersentation Theorem, Self adjoint, Unitary and normal operators, Hilbert-Adjoint Operator, The Hahn-Banach Extension Theorem, Uniform boundedness Theorem (The Banach-Steinhaus Theorem), Open Mapping Theorem and Closd Graph Theorem.

References:

1.Erwin Kreyszig, Introductory Functional Analysis with Applications, John Wiley& Sons, New York.

2. W. Rudin, Functional Analysis, Tata McGraw Hill Pub. Co.

3.I.J.Maddox, Elements of Functional Analysis, Cambridge University Press.

4.B.Limaye, Funtional Analysis, New age international Ltd. Pub.