Nagindas Khandwala College (Autonomous)

MKES's Nagindas Khandwala College (Autonomous),
Gate No 5, Bhavishya Bharat Campus, S. V. Road, Malad (West)
Mumbai-400 064

Program Code: UHCAS

Bachelor of Commerce (B.Com.) (Honours) in Actuarial Studies

Three Year Integrated Honours Programme

Six Semesters

Course Structure

Under Choice Based Credit, Grading and Semester System

To be implemented from Academic Year- 2021-2022

Progressively

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1. Preamble

Actuarial Profession & Increasing demand for Actuaries

The profession of Actuaries was not sufficiently ventured in the past in India due to lack of awareness. The core of actuarial work lies within insurance. Since Insurance industry in India was nationalized for long from 1956-1999, Actuarial studies as a profession could not develop and prosper. With the opening up of the Indian economy and globalization, demand of actuaries increased many-fold in India. The demand of actuaries is rising world over in the sphere of enterprise risk management. Actuaries evaluate, manage and advise on all types of quantifiable risks (including financial, operational financial risks scientifically. They are considered to be the best risk managers as they use their knowledge of business and economics, together with their understanding of probability theory, statistics and investment theory, to provide strategic, commercial and financial advice. Actuaries are the only professionals who focus on estimation of uncertain future liabilities. Only qualified actuaries can certify such liabilities across the globe. Actuarial knowledge has a critical utility in data analytics and enterprise risk management.

Speaking at the Virtual Actuarial Conclave 2021, on 10th March,2021, IRDAI Chairman Subash Chandra Khuntia said: "If we look at the number of actuaries India has, it is not adequate for a country of our size. At present, we have only 458 full-fledged actuaries."

"Looking at the number of insurance companies we have and the size of our insurance business, which is 1.7 per cent of the global insurance industry and considering the fact that we have 60,000 actuaries globally, I think we should at least aspire to have 1,000-1,200 actuaries in the country as soon as possible," he added. He mentioned that actuaries are needed for insurance sector, banking sector as well as other financial sectors.

Job of Actuaries in the world is considered to be the Best job, mostly it ranks in the top 5 jobs (often Ranked #1) for the last 4 decades. With risk-based capital regime on the anvil, it is estimated that there will be a 30-40 percent increase in number of actuarial positions required by insurers. Demand of actuaries is steadily growing in data analytics. Greater demand would emerge when the industries in India begin employing actuaries for their

risk management function. Globally, majority of actuaries are engaged in risk management.

This Bachelor of Commerce (Honours) – Actuarial Studies Degree Program is designed keeping in mind the latest curriculum of the actuarial profession (that has come in force in 2019) and the skills needed to become job-ready in the field of actuaries and analytics. Detailed coverage of all aspects of the profession will provide students the right blend of knowledge and skills along with Global exposure.

1.1 About Khandwala College:

Khandwala College is a multi-faculty institution (Estd. 1983), affiliated to University of Mumbai. It offers 13 UG, 5 PG, 4 Add On, 3 Ph. D programs with 9 Departments and 2 Research Centresimparting education to more than 6500 students. The **Vision** of the institute includes Education for all, Education for the youth and Education for the future of our country.

The **Mission** is to serve the society at large and students belonging to linguistic minority in particular with commitment, dedication and devotion. The **Quality Policy** includes commitment towards imparting **Quality Education to youth**, enabling them to **develop right attitude**, **professional competence** and inculcating right **ethical values**.

The institution has been awarded **"A"** Grade (Third Cycle) by National Assessment and Accreditation Council, **Best College** by University of Mumbai (2012), **lead college** for a cluster of colleges, Educational Excellence Award by Indus Foundation, USA and **Best Ensemble Faculty (Academic Brilliance Awards – 2013)** by Education Expo TV's Research Wing for Excellence in Professional Education & Industry and ISO 9001:2015 certified by TUV Nord. We have been awarded **IMC Ramkrishna Bajaj National Quality Commendation Certificate** in 2013-14. Our college has been awarded Autonomous status from 2016. Khandwala College, as an Autonomous College; is offering a new **Bachelor of Commerce (Honours) Programme in Actuarial Studies as a Three Year Integrated Programme –** with Six Semesters *Course Structure* - Under Choice Based Credit, Grading and Semester System**.**

1.2 Vision and Mission of Khandwala College

Vision:

- Education for all
- Education for the youth
- Education for the future of our country

Mission The college's focus is on the future of our students irrespective of their gender and place in society. Every student is like a flame reaching out to the brightness of the sun i.e. the bright future of India.

2 Objectives

This program of B. Com. (Honours) - Actuarial Studies is structured to provide graduates with practical skills required in international actuarial field. The main objectives of B. Com. (Honours) - Actuarial Studies Program are:-

- To provide intensive theoretical & practical knowledge in all aspects of risk management.
- To provide an integrated perspective of management functioning along with a good amount of exposure to real life cases / technical knowhow on crucial aspects of Insurance products pricing and reserving
- To produce bachelors with a strong background in Mathematics, Statistics, Economics, Finance and Analytics to deal with Data Analysis in the areas of Financial Sector such as Insurance, Banking, Capital Market and other Financial Applications in view of sustained growth envisaged in Insurance Industry and KPO industry at large in the financial sector.
- To develop participants' competencies to identify the possibility of a bad event, or a catastrophe; evaluate a solution to minimize the possibility of said bad event, or catastrophe, from occurring and also analyze the losses, that the risk might bring about, and devise solutions to reduce its consequences to the economy.
- To make program participants job-ready in the profession of actuaries and analytics.
- To provide expert's knowledge to undertake Actuarial profession and become a catalyst in the process of becoming actuary.

2.1 Program Outcome: On successful completion of this program, a participant shall be able to

PO1: Comprehensive Knowledge: demonstrate a capability of executing comprehensive knowledge and understanding of Mathematics, Statistics, Economics, Finance and Analytics to deal with Data Analysis in the areas of Financial Sector such as Insurance, Banking, Capital Market and other Financial and undertake professional examinations in the subjects of CS1A,

CS1B, CS2A, CS2B, CM1A, CM1B, CM2A, CM2B, CB1, CB2, CB3, CP2, CP3, SP1, SP2, SP4, SP5, SP7 of Institute and Faculty of Actuaries, UK and equivalent subjects of Institute of Actuaries of India.

PO2: **Communication Skill:** communicate problems in business and work towards their solutions

PO3: **Critical Thinking and Problem Solving**: demonstrate ability to think critically and analyse and synthesize data and derive inferences for valid conclusion by developing an integrated perspective of management functioning along with a good amount of exposure to real life cases / technical knowhow

PO4: Research and Projects: ability to search for, locate, extract, organise, evaluate, and use or present information that is relevant to a particular topic and work independently as well as in team on diverse projects and ensure detailed study of various facets of Finance and Business

PO5: ICT Skills: illustrate capability to use various softwares such spreadsheet, R programming, Python programming for exploring, analysis, and using the information or business purposes as a part of application of ICT

PO6: Risk Assessment and Risk Management: calculate the probability of a loss event, or a catastrophe; evaluate a solution to minimize the probability of said loss event, or catastrophe, from occurring and also analyze the losses that the risk might bring about, and create solutions to reduce its consequences to the economy (i.e. risk management).

PO7: Moral and Ethical Awareness: ascertain unethical behaviour, falsification, and manipulation of information

3. Eligibility, Selection and Admission Criterion:

Candidates for being eligible for admission to the three-year course leading to the Degree of Bachelor of Commerce (Honours) – Actuarial Studies, shall be required to have passed the Higher Secondary School Certificate Examination (10+2) or equivalent qualification from a recognized Board/ University or Body recognized as equivalent thereof by the Senate of the University, with minimum 50% aggregate marks or equivalent in any Stream.

3.1 Eligibility Criterion:

- Std. XII passed in any discipline with 50% or more marks on the aggregate and having English as a subject
- Good Communication Skills

3.2 Selection & Admission Criterion for Eligible Candidates:

- The interested students shall register for Aptitude Test and Interview.
- Reservations as per University rules will be applicable.

The admission of students shall be based on

- Academic and non- academic credentials till date
- Performance in Aptitude Test [comprising of questions in Mathematics/Statistics, English, Logical Reasoning, Analytical Ability], and
- Performance in Personal Interview

3.3 Eligibility for the Award of the Degree:

A candidate shall be eligible for the award of the Degree only if he / she has undergone the prescribed course of study in Khandwala College affiliated to the University for a period of not less than three academic years, passed the examinations of all the Six Semesters earning 148 credits with letter grade of D or higher (i.e. O/ A+/A/ B+/B/C/D) in core courses.

3.4 Intake Capacity

One Division with maximum 60 Students in the first year.

3.5 Fee structure

The tuition fees for B.Com. (Honours) in Actuarial Studies will be Rs. 150,000 p.a.

4 Ordinances & Regulations for B. Com. (Honours) Actuarial Studies

4.1 General Guidelines:

The Credits are defined in terms of the learner's hours which are divided into two parts such as Actual and Notional. The value of a particular course can be measured in number of Credit Points. The value of One (01) Credit is equal to 15 Hours of learners' load.

The scheme of Examination shall be divided into TWO parts i.e. Continuous Internal Evaluation including Assignment, Projects, Seminars, Case Studies and Class Tests which will be of 40 marks and the Semester End Examinations which will be of 60 marks. The semester wise Credit Points will be varied from course to course but the value of Credits for Under-Graduate Programme shall be of 148 Credits (including 8 extra credits under autonomy).

Scheme of Total Credits

Sr. No.	Year	Credits
1	Year 1	52
2	Year 2	44
3	Year 3	52
	Total Credits for Award of Degree	148

4.2 Credit Based Evaluation System Scheme of Examination

For all 6 semesters, the performance of the learners shall be evaluated into two components. The first component shall carry 40% marks which will be a Continuous Internal Evaluation while the second component shall carry 60% marks at semester end examination.

The allocation of marks for the Continuous Internal Evaluation 40% and Semester End Examination 60% are as shown below:

Structure of Continuous Internal Evaluation – 40% Weight- 40 Marks

Sr. No.	Particulars	Marks
1	Two periodic class tests held in the given semester (Best of the TWO) OR A single class test mid-way during the semester	20
2	Subject specific Term Work Module/assessment modes – as decided by the department in the beginning of the semester (like Extension/field/experimental work, Short Quiz; Objective test, lab practical, open book test etc. and written assignments, Case study, Projects, Presentations, Posters and exhibits etc. for which the assessment is to be based on class presentations wherever applicable)	15
3	Active participation in routine class instructional deliveries (and in practical work, tutorial, field work etc. as the case may be)	5
Total		40

Semester End Examination will be organized after all modules of the course are taught in the class. It will be a written examination / or as per the needs of the course a practical examination or a combination of both. This examination will be for 60% weight. For all Courses having Practical and Theory Component, Examination will be conducted for total 150 marks, (100 marks for Theory and 50 marks for Practical) which would then be converted into 100 marks.

The assessment of Continuous Internal Evaluation and Semester End Examination as mentioned above for the Semesters I to VI shall be processed by the College and shall issue the grade cards to them after the conversion of marks into grade as the procedure mentioned below.

To pass a course, the learners shall have to obtain a minimum of 40% marks in aggregate for each course where the course consists of Continuous Internal Evaluation & Semester End Examination. The learner shall obtain minimum of 40% marks (e.g. 16 out of 40) in the Continuous Internal Evaluation and 40% marks in Semester End Examination (e.g. 24 Out of 60) separately, to pass the course and minimum of Grade D in each project,

wherever applicable, to pass a particular semester. A learner will be said to have passed the course if the learner passes both the Continuous Internal Evaluation & Semester End Examination.

Passing Standards

Grade	Marks%	Grade Points
O	80 & Above	10
A+	70 to 79.99	9
A	60 to 69.99	8
B+	55 to 59.99	7
B	50 to 54.99	6
C	45 to 49.99	5
D	40 to 44.99	4
F	Less than 40	0

4.3 Carry Forward of The Marks in Case The Learner Gets 'F' Grade in One Or More Subjects:

- A learner who PASSES in the Continuous Internal Evaluation Examination but FAILS in the Semester End Examination of the course shall reappear for the Semester End Examination. Marks for Continuous Internal Evaluation shall be carried over and he/she shall be entitled for grade obtained by him/her on passing.
- A learner who PASSES in the Semester End Examination but FAILS in the Continuous Internal Evaluation of the course shall reappear for the Continuous Internal Evaluation Examination of that course. However, his/her marks of the Semester End Examination shall be carried over and he/she shall be entitled for grade obtained by him/her on passing.
- For Courses without practical: In case of a learner who is reappearing for the Continuous Internal Evaluation Examination, the examination will consist of two projects of 20 marks each.

4.4 Allowed to Keep Terms (ATKT) Facility:

As per University rules and regulations

Additional Examinations:

A. Continuous Internal Evaluation: As per University rules and regulations Class test or assignment for Continuous Internal Evaluation as per University rules and regulations

B. Semester End Examinations: As per University rules and regulations

Eligibility to Appear for Additional Semester End Examination:

As per University rules and regulations

Mode of Conduct of Semester End Additional Examination:

As per University rules and regulations

4.5 Evaluation of Projects (Wherever Applicable)

- A learner who PASSES IN ALL THE COURSES BUT DOES NOT secures minimum grade of D in projects as applicable, has to resubmit a fresh project (if required even repeatedly) till he/she secures a minimum of grade D. His/her marks in the theory papers that the learner has passed will be carried forward and he/she shall be entitled for grade obtained by them on passing.
- The evaluation of project and viva-voce examination shall be by award of grade in the ten point scale.
- A learner shall have to obtain minimum of grade D (or its equivalent marks) in project evaluation and viva voce taken together to obtain 40% marks in project work.

4.6 Calculations of GPA & SGPA

As per University rules and regulations

5 Teaching Methodology

5.1 Classroom Sessions:

- Regular Lectures: Lectures shall be delivered by experienced faculties along with vising faculties and experts from the Industry.

- Assignments & Projects: Shall be assigned at regular intervals of the course. It offers an opportunity for students to meet, interact and collaborate with the experienced people from the industry.

- Knowledge Workshops and Industry seminars: Shall be organized at regular intervals to keep the students informed about the latest developments in the Industry. These workshops will be uniquely designed with a focus on practical industry – relevant topics.

- Simulated Events: Shall be conducted to get the real feel of organizing and managing an activity like risk analysis in Investments, in insurance business etc. The exercise gives the student's an opportunity to identify the finer nuances of industry thereby helping them to identify key success factors and areas of improvement.

5.2 Guest Lectures and Case Studies:

- **Guest Lectures**: Eminent people from the industry shall be invited as guest speakers to impart lessons and their rich experiences on various fields related to areas of actuary to the student. They also focus on imparting training around management concepts that have today become essential skills to carve a niche in the industry.
- **Case Studies**: Case studies highlighting various practical and situational issues shall be regularly discussed during classroom sessions. The discussion caters towards identifying what went wrong in the case and what could have been done

in a better manner, this helps train students to handle such situations in the future. The exercise also improves the analyzing and analytical of our students.

5.3 Innovative & Interactive Learning Technology

- **Educational wikis**: It keeps track of education – oriented wikis, establishes constructive interactions with them, and researches their technology, activity, culture, processes and impact.

- **Creative Presentation Ideas**: Prezi is a powerful communication and presentation tool that aims to replace Power point Presentation. Equipping students with the knowledge of this tool helps in preparing them to adapt easily to every changing dynamics of the corporate world.

- **CREATE through Technology**:

Communication and Collaboration: Google Apps provides students a chance to learn how to use webmail services, calendar (shared calendaring), G-Talk (instant messaging and voice/video chat) and Drive (online document creation & sharing). Education through Blogs: A powerful and interactive medium for learning. Ideal to educate, discuss and share innovative ideas across a large and diverse set of audiences.

- **Unparalleled Internships & Practical Training**

Students at Khandwala College get opportunities to participate in National & International Events round-the-year. They get Practical Training during internship.

In-House Events: Students are provided with an opportunity to work on conferences and seminars organized in-house right from the start to finish, to provide them with hands-on experience, which helps them to gain excellent event organization skills

6 Board of Studies

Sr. No.	Category	Name	Affiliation
1	Chairman	Dr. Moushumi Datta	Nagindas Khandwala College, Mumbai
2	Special Invitee	Dr. Ancy Jose	Nagindas Khandwala College, Mumbai
3	Special Invitee	Dr. Varsha Ainapure	Nagindas Khandwala College, Mumbai
4	Entire faculty of each Specialisation	Prof. Rajendra Shah Mrs. Purnima Shah Dr. Mrinalini Kohojkar	Nagindas Khandwala College, Mumbai
5	Subject experts from outside the parent university (2) *	(i) Dr. Arshia Kaul Assistant Professor	Anil Surendra Modi school of commerce, NMIMS, Mumbai
		(ii) Dr. K. Sriram	FIA of UK, India(FIAI), Visiting Faculty at IIM (B)
6	Expert nominated by the Vice-chancellor (1) **	DR. Dr. Annapurna Shankarnarayanan	Associate Prof. & Vice Principal (Arts) St. Xavier's College, Autonomous, Mumbai
7	Representative from industry/corporate sector/allied area relating to placement (1)	Mayur Ankolekar	FIA of UK, Consulting Actuary, Ankolekar & Co
8	Postgraduate meritorious alumnus ***	NA	NA
9	Chairman, with the approval of the Principal, may co-opt (a) Experts from outside the college whenever special courses of studies are to be formulated. (b) Other members of staff of the same faculty.	NA	NA

7. Curriculum Framework for *Bachelor of Commerce (B.Com.) (Honours) in Actuarial Studies*
Under Choice Based Credit, Grading and Semester System

Course Structure

FIRST YEAR

(To be implemented from Academic Year- 2021-2022)

No.	Semester I		Credits	No.	Semester II		Credits
Ability Enhancement Compulsory Courses (AECC)				***Ability Enhancement Compulsory Courses (AECC)***			
1	Foundation Course **2111UCHAFC**	AECC-1	3	1	Environmental Studies **2121UCHAES**	AECC-2	3
Core Courses (CC)				***Core Courses (CC)***			
2	Actuarial Statistics 1A [Theory + Practical] **2112UCHAAS**	CC-1	4+2	2	Actuarial Statistics 2A [Theory + Practical] **2122UCHAAS**	CC-3	4+2
3	Actuarial Statistics 1B [Theory + Practical] **2113UCHAAS**	CC-2	4+2	3	Actuarial Statistics 2B [Theory + Practical] **2123UCHAAS**	CC-4	4+2
Discipline Specific Elective (DSE) Courses				***Discipline Specific Elective (DSE) Courses***			
4	Any <u>one</u> from DSE Group A • Actuarial Accounting 1 • Mathematics for Actuaries 1 **2114UCHAAC/MA**	DSE-1	3	4	Any <u>one</u> from DSE Group A • Actuarial Accounting 2 • Mathematics for Actuaries 2 **2124UCHAAC/MA**	DSE-2	3
Skill Enhancement Compulsory Courses (SEC)				***Skill Enhancement Compulsory Courses (SEC)***			
5	R Programming [Practical] **2115UCHARP**	SEC-1	4	5	Advanced Excel with Macros [Practical] **2125UCHAEX**	SEC-2	4
Generic Elective (GE 1)				***Generic Elective (GE 2)***			
6	Any <u>one</u> from GE Group A • Finance Professional Skill Development Course • Operations Research **2116UCHAFP/OR**	GE-1	4	6	Any <u>one</u> from GE Group B • Python Programming Financial Planning **2126UCHAPP/FP**	GE-2	**4**
	TOTAL		**26**		**TOTAL**		**26**

SECOND YEAR

(To be implemented from Academic Year- 2022-2023)

No.	Semester III		Credits	No.	Semester IV		Credits
Core Courses (CC)				***Core Courses (CC)***			
1	Actuarial Mathematics 1A [Theory] **2131UCHAM**	CC-5	4	1	Actuarial Mathematics 2A [Theory] **2141UCHAM**	CC-10	4
2	Actuarial Mathematics 1B [Theory] **2132UCHAM**	CC-6	4	2	Actuarial Mathematics 2B [Theory] **2142UCHAM**	CC-11	4
3	Actuarial Mathematics 1C [Theory] **2133UCHAM**	CC-7	4	3	Actuarial Mathematics 2C [Theory] **2143UCHAM**	CC-12	4
4	Actuarial Mathematics 1 [Practical] **2134UCHAM**	CC – 8 (5, 6,7) related	4	4	Actuarial Mathematics 2 [Practical] **2144UCHAM**	CC- 13 (10,11,12 related)	4
5	Insurance Principles and Designing of Insurance Products [Theory + Practical] **2135UCHAIP**	CC- 9	4+2	5	Data Analytics [Theory + Practical] **2145UCHADA**	CC-14	4+2
	TOTAL		**22**		**TOTAL**		**22**

THIRD YEAR

(To be implemented from Academic Year- 2023-2024)

No.	Semester V		Credits	No.	Semester VI		Credits
Core Courses (CC)				***Core Courses (CC)***			
1	Actuarial Economics 1 [Theory and Practical] **2151UCHAE**	CC-15	4+2	1	Actuarial Economics 2 [Theory and Practical] **2161UCHAE**	CC-17	4+2
Generic Elective (GE 3)				***Generic Elective (GE 4)***			
2	Any <u>one</u> from GE Group C • Actuarial Business Management • Entreprenuership **2152UCHABM/EN**	GE-3	3	2	Any <u>one</u> from GE Group D • Insurance Laws • Digital Marketing **2162UCHAIL/DM**	GE-4	3
Core Courses (CC)				***Core Courses (CC)***			
3	Actuarial Project – 1 **2153UCHAP**	CC - 16	6	3	Actuarial Project – 2 **2163UCHAP**	CC-18	6
Discipline Specific Elective (DSE) Courses				***Discipline Specific Elective (DSE) Courses***			
4	Any <u>one</u> from DSE Group C **2154UCHA SL / LI / EB / FR**	DSE-3	4	4	Any one from DSE Group D **2164UCHA SI / NL / HI / FI**	DSE-5	4
5	Any <u>one</u> from DSE Group C	DSE-4	4	5	Any <u>one</u> from DSE Group D	DSE-6	4
	DSE Group C Subjects				DSE Group D Subjects		
	• Securities Laws • Life Insurance • Employee Benefits and Laws • Financial Reporting Standards **2155UCHA SL / LI / EB / FR**				• Social Insurance • Non-life Insurance • Health Insurance • Finance and Investment **2165UCHA SI / NL / HI / FI**		
Ability Enhancement Compulsory Courses (AECC)				***Ability Enhancement Compulsory Courses (AECC)***			
6	Actuarial Business Communication 1 **21956UCHABC**	AECC -3	3	6	Actuarial Business Communication 2 **2166UCHABC**	AECC -4	3
	TOTAL		**26**		**TOTAL**		**26**

7.1 DISTRIBUTION OF CREDITS

Year 1	52
Year 2	44
Year 3	52
Total	148

7.2 Code Description

For Example, Foundation Course: **2111UCHAFC**

21	Start Year of Implementation
11	Semester & Sr. No.
U	Under Graduate
C	Commerce Stream
H	Honours
A	Actuarial Studies
FC	Course Name

Bachelor of Commerce (Honours) Programme in

Actuarial Studies

Three Year Integrated Programme -

Six Semesters

Basic Structure: Distribution of Courses

1	**Ability Enhancement Compulsory Course (AECC)**	4 Courses of 3 Credit Hrs. each (Total Credit Hrs. 4*3)	12
2	**Skill Enhancement Compulsory Course (SEC)**	2 Courses of 4 Credit Hrs. each (Total Credit Hrs. 2*4)	8
3	**Core Course** **-Practical** **-Theory**	10 Courses of 6 Credit Hrs. each (Total Credit Hrs.10*6) and 8 Courses of 4 Credit Hrs. each (Total Credit Hrs. 8*4)	92
4	**Discipline Specific Elective (DSE)**	2 Courses of 3 Credit Hrs. each (Total Credit Hrs. 2*3) 4 Courses of 4 Credit Hrs. each (Total Credit Hrs. 4*4)	22
5	**Genetic Elective (GE)**	2 Courses of 3 Credit Hrs. each (Total Credit Hrs. 2*3) 2 Courses of 4 Credit Hrs. each (Total Credit Hrs. 2*4)	14
	Total Credits Hrs		148

Nagindas Khandwala College (Autonomous)

Syllabus and Question Paper Pattern of

Courses of Bachelor of Commerce (Honours) in Actuarial Studies

First Year

Semester I and II

Under Choice Based Credit, Grading and Semester System

(To be implemented from Academic Year- 2021-2022)

Curriculum Framework for *Bachelor of Commerce (B.Com.) (Honours) in Actuarial Studies*

FIRST YEAR

(To be implemented from Academic Year- 2021-2022)

No.	Semester I		Credits	No.	Semester II		Credits
Ability Enhancement Compulsory Courses (AECC)				***Ability Enhancement Compulsory Courses (AECC)***			
1	Foundation Course **2111UCHAFC**	AECC-1	3	1	Environmental Studies **2121UCHAES**	AECC-2	3
Core Courses (CC)				***Core Courses (CC)***			
2	Actuarial Statistics 1A [Theory + Practical] **2112UCHAAS**	CC-1	4+2	2	Actuarial Statistics 2A [Theory + Practical] **2122UCHAAS**	CC-3	4+2
3	Actuarial Statistics 1B [Theory + Practical] **2113UCHAAS**	CC-2	4+2	3	Actuarial Statistics 2B [Theory + Practical] **2123UCHAAS**	CC-4	4+2
Discipline Specific Elective (DSE) Courses				***Discipline Specific Elective (DSE) Courses***			
4	Any <u>one</u> from DSE Group A • Actuarial Accounting 1 • Mathematics for Actuaries 1 **2114UCHAAC/MA**	DSE-1	3	4	Any <u>one</u> from DSE Group A • Actuarial Accounting 2 • Mathematics for Actuaries 2 **2124UCHAAC/MA**	DSE-2	3
Skill Enhancement Compulsory Courses (SEC)				***Skill Enhancement Compulsory Courses (SEC)***			
5	R Programming [Practical] **2115UCHARP**	SEC-1	4	5	Advanced Excel with Macros [Practical] **2125UCHAEX**	SEC-2	4
Generic Elective (GE 1)				***Generic Elective (GE 2)***			
6	Any <u>one</u> from GE Group A • Finance Professional Skill Development Course • Operations Research **2116UCHAFP/OR**	GE-1	4	6	Any <u>one</u> from GE Group B • Python Programming Financial Planning **2126UCHAPP/FP**	GE-2	**4**
	TOTAL		**26**		**TOTAL**		**26**

Nagindas Khandwala College (Autonomous)

Syllabus and Question Paper Pattern Of

First Year Semester I

1. Foundation Course

Under Academic Autonomy and Credit, Grading and Semester System

With effect from Academic Year 2021-22

Syllabus: Foundation Course

Course Objective

To make a student aware of

- Composition of Indian society from many facets and impact of globalization
- Impact of Politics and power changes on social and economic growth
- Actuarial profession and role of actuary, Professional Ethics, Constitution and Role of Institute of Actuaries of India
- Impact of Several Influential People (Indian and International)

Course Outcome

On successful completion of this course, student should be able to

- describe composition of Indian society (Remember)
- describe impact of globalization (Understand)
- explain impact of Politics and power changes on social and economic growth (Understand)
- state constitution and role of Institute of Actuaries of India (Remember)
- describe role of actuary
- describe achievements of some famous people, analyse their strengths and describe the impact of their deeds on our lives (Remember, Analyse)

Syllabus: Foundation Course

Modules at a Glance

Sr. No.	Topics	No. of lectures
Module 1	**Indian Society and Globalization**	07
Module 2	**Impact of Politics and Power Changes**	06
Module 3	**Actuarial Profession**	07
Module 4	**How some influential people have impacted our lives?**	10
	Total	**30**

Detailed Syllabus

Module	Topics	No. of Lectures
1	**Indian Society and Globalisation**	**07**
	• Multi-cultural diversity of Indian society through its demographic composition: population distribution according to religion, caste, gender, geographical location and level of education • Concepts of liberalization, privatization and globalization • Growth of information technology and communication and its impact manifested in everyday life • Impact of globalization on industry: changes in employment and increasing migration • Effect of Globalization on economic and financial growth • Changes in agrarian sector due to globalization	
2	**Impact of Politics and Power Changes**	**06**
	Impact of Uncertainties about the ruling party and their policies on • Financial markets • Agriculture sector • Subsidies and taxation • Growth plans of companies • Social Welfare Schemes	
3	**Actuarial Profession**	**07**
	• What is actuarial science • Who is an actuary • Role of an actuary • What is needed to become a good student of actuarial science • Applications of Actuarial science in various fields • Future scope for an actuary • History of Actuarial profession in India • Institute of Actuaries of India – Structure, Role, Responsibilities • Ethics for Actuary	
4	**How some influential people have impacted our lives?**	**10**

	The lives of people to include (but not limited to) • Gautam Buddha • Mahatma Gandhi • Swami Vivekanand • Dhirubhai Ambani • J R D Tata • Kautilya • S Ramanujan • Rabindranath Tagore • Mother Teresa • Warren Buffet • Bill Gates • Albert Einstein • Isaac Newton • Leonardo Da Vinci The students are expected to learn suitable Software and make Presentations of different personalities.	

Reference Books and Articles:

- Foundation Course Study Material of University of Mumbai http://archive.mu.ac.in/myweb_test/F.Y.B.A.%20&%20B.Com%20-%20Foudation%20Course%20%28Eng%29.pdf

- Politics, Power and Change: What is Next for ASEAN? by KPMG https://assets.kpmg.com/content/dam/kpmg/sg/pdf/2017/05/politics-power-and-change- what-next-for-asean.pdf

- Study Material on Actuaries Act and Actuarial Profession of Institute of Actuaries of India

- Incarnations: India in 50 Lives by Sunil Khilnani, Publisher: Penguin Random House India, ISBN: 9780143429333, 0143429337

Nagindas Khandwala College (Autonomous)

Syllabus and Question Paper Pattern Of

First Year Semester I

***2. Actuarial Statistics 1A* (Theory and Practical))**

Under Academic Autonomy and Credit, Grading and Semester System

With effect from Academic Year 2021-22

Syllabus : Actuarial Statistics 1A (Theory)

Course Objective

The aim of this course is to provide a grounding in statistical techniques that are of particular relevance to actuarial work.

Course Outcome

On successful completion of this course, student should be able to

- Calculate various statistical measures and Interpret them (Apply)
- Summarise data using appropriate statistical analysis, descriptive statistics and graphical presentation (Analyse, Apply)
- Calculate probabilities of simple and compound events (Evaluate)
- Define random variables and determine their distributions in various actuarial applications (Analyse)
- Describe the essential features of statistical distributions (Understand)
- Determine generating functions (Apply)
- Calculate probabilities and other measures from standard discrete and standard continuous distributions (Evaluate)

Syllabus Actuarial Statistics 1A

Modules at a Glance

Sr. No.	Topics	No. of lectures
Module1	**Summary Statistics and Probability**	15
Module2	**Discrete Random Variables and Discrete Distributions**	15
Module3	**Continuous Random Variables and Continuous Distributions**	15
Module4	**Data Analysis**	15
	Total	60

Detailed Syllabus

Module	Topics	No. of Lectures
1	**Summary Statistics and Probability**	**15**
	• Data types and Presentation: Frequency distribution, tabular, graphical and diagrammatic presentation • Data interpretation • Summary Measures: Measures of central tendency, location, dispersion, skewness, kurtosis *and* moments • Probability using Classical approach, Empirical approach and Axiomatic approach • Probability of compound events using Addition theorem, Multiplication theorem and Bayes' theorem	
2	**Discrete Random Variables and Discrete Distributions**	**15**
	• Discrete random variable, probability mass function, cumulative distribution function, calculation of probability • Expectation, variance, median, mode, moments and other measures. Properties of Expectation and Variance • Standard Discrete Distributions: Discrete Uniform, Bernoulli's, Binomial, Poisson, Geometric Type I and Type II, Negative Binomial Type I and Type II, Hypergeometric. Their Key characteristics and Calculation of Probability (Using Actuarial Tables and otherwise) • Generating Functions: Probability Generating Function, Moment Generating Function and Cumulant Generating Function. Their key properties, determination of these functions and their use in finding various other measures • Joint Discrete Probability Distribution: Joint, Marginal and Conditional Probability functions, Joint CDF, Covariance and Correlation Coefficient, Joint Moment Generating Function	

3	**Continuous Random Variables and Continuous Distributions**	**15**
	• Continuous random variable, probability density function, cumulative distribution function, survival function, calculation of probability • Expectation, variance, median, mode, moments and other measures • Standard Continuous Distributions: Rectangular, Exponential, Gamma, Beta I, Beta II, Normal, Log Normal, Chi-square, t, F, Pareto, Weibul, Burr. Their Key characteristics and Calculation of Probability, Percentiles (Using Actuarial Tables and otherwise), Generating functions • Central Limit theorem and its applications • Joint Discrete Probability Distribution: Joint, Marginal and Conditional Probability functions, Joint CDF, Covariance and Correlation Coefficient, Joint Moment Generating Function • Conditional Expectation, Conditional Variance and their key result	
4	**Data Analysis**	**15**
	• Exploratory Data Analysis involving calculation of summary statistics and data visualization • Pearson's, Spearman's and Kendall's measures of correlation for bivariate data • Principal Component Analysis • Random sampling and sampling distributions of sample mean, sample variance, sample proportion • Fisher-Cochran's theorem, Student's t and Snedecor's F statistics and their distributions	

Reference Books:

Sr. No.	Title Author	Edition Year	ISBN Publisher
1.	ActEd Study Material Subject CT3	2018	Actuarial Education Company acted@bpp.com
2.	John Freund's Mathematical Statistics with Applications by Miller, Miller	2003	131427067 Prentice Hall India
3.	Elementary Statistics by Mario Triola	2006	9780321369185 Prentice Hall
4.	Descriptive Statistics by R. J. Shah	2010	Sheth Publishers
5.	Statistical Methods by R. J. Shah	2010	Sheth Publishers
6.	Statistics by M.G. Diwan and R. Ramkrishnan	2003	Insurance institute of India

Syllabus: Actuarial Statistics 1A (Practical) – No of Lectures - 30

Course Outcome

On successful completion of this course, student should be able to use scientific calculator, spreadsheet software to

- Calculate various statistical measures and Interpret them (Apply, Analyse)
- Summarise data using appropriate statistical analysis, descriptive statistics and graphical presentation. (Analyse, Apply)
- Calculate probabilities of simple and compound events (Evaluate)
- Calculate probabilities and other measures from standard discrete and standard continuous distributions (Evaluate)
- Perform data analysis including principal component analysis (Analyse).

A student should carry out practical exercises to achieve the abovementioned competence.

Practical Examination: Total Marks 50

Theory and Practical marks scored by a student shall then be merged in the ratio of 2:1 to convert to a total of 100 marks.

Nagindas Khandwala College (Autonomous)

Syllabus And Question Paper Patter Of

First Year Semester - I

2. Actuarial Statistics 1B [Theory and Practical]

Under Academic Autonomy and Credit, Grading and Semester System

With effect from Academic Year 2021-22

Syllabus: Actuarial Statistics 1B [Theory]

Course Objective

The aim of this course is to provide a grounding in statistical techniques leading to inferences that are of particular relevance to actuarial work.

Course Outcome

On successful completion of this subject, a student will be able to:

- describe and apply the principles of statistical inference (Understand, Apply)
- calculate point estimates and interval estimates of parameters under different distribution environments (Evaluate)
- calculate test statistic and perform a test of significance for various parameters under appropriate distributional environments (Evaluate, Analyse)
- describe, apply and interpret the results of the linear regression model and generalised linear models.(Understand, Apply, Analyse)
- explain the fundamental concepts of Bayesian statistics and use them to compute Bayesian estimators.(Understand, Apply)

Syllabus: Actuarial Statistics 1 B(Theory)
Modules at a Glance

Sr. No.	Topics	No. of lectures
Module1	Point and Interval Estimation	15
Module2	Hypothesis Testing and Tests of Significance	15
Module3	Regression Theory and Its Applications	15
Module4	Bayesian Statistics	15
	Total	60

Detailed Syllabus

Module	Topics	No. of Lectures
1	**Point and Interval Estimation**	**15**
	• Define Population, Sample, Parameter, Statistic, Estimator, Estimate, Bias, Mean Square Error, Unbiased Estimator, Efficiency, Sufficiency, Consistency • Methods of Point Estimation: Method of Moments, Method of Percentiles, Method of Maximum Likelihood Estimation, Method of Least Squares, Method of Minimum Chi-square • Properties of M.L.E., Cramer Rao Lower Bound for Variance of an Unbiased Estimator • Bootstrap Method to estimate properties of an estimator • Concept of Confidence Interval, Confidence interval for an unknown parameter using a given sampling distribution • Confidence Interval for Mean, Proportion, Poisson Mean, Difference between means, Variance, Ratio of Variances, Coefficient of Correlation	
2	**Hypothesis Testing and Tests of Significance**	**15**
	• Concepts of Statistical Hypothesis, Null and Alternative Hypothesis, Simple and Composite Hypothesis, Type I and Type II Errors, Test Statistic, Critical Region, Level of Significance, Power of a test, Test of Significance • Probability-value of a test, Likelihood ratio test • Large Sample Tests as Applications of Normal Distribution: Tests for One/Two Population Mean(s)/Proportion(s) • Large Sample Tests for Population Correlation Coefficient(s) using Fisher's z-transformation • Chi-square Test for (i) one population variance, (ii) goodness of fit, (iii) independence of attributes • t-tests for Mean(s) of One/Two Normal Population Mean(s), Paired t-test, t-test for Significance of Bivariate Normal Population Correlation Coefficient and Regression Coefficient • F-test for (i) comparison of two population variances, (ii) simultaneous equality between several population means (ANOVA)	

3	**Regression Theory and Its Applications**	**15**
	• Concepts of response variables, explanatory variables • Simple linear regression model with single explanatory variable : derivation of least squares estimates of slope and intercept parameters and their interpretation • Multiple linear regression model with several explanatory variables : derivation of least squares estimates of parameters and their interpretation • Use measures of model fit to select an appropriate set of explanatory variables. • Generalised Linear Model (GLM: Definition of an exponential family of distributions, Its Mean, Variance, Variance Function, Scale Parameter, Link function, Canonical link function of various distributions of the family • GLM: Concept of a variable, a factor taking categorical values andan interaction term. Definition of the linear predictor, illustration of its form for simple models, including polynomial models and models involving factors. • Definition of the deviance and scaled deviance, Estimation of the parameters ofa GLM, Choice of a suitable model by using an analysis of deviance and by examining the significance of the parameters, Pearson and Deviance residuals and their use • Apply statistical tests to determine the acceptability of a fitted model: • Pearson's Chi-square test and the Likelihood ratio test	

4	**Bayesian Statistics &Data Analysis**	**15**
	• concepts of prior probability and posterior probability • use of Bayes' Theorem to calculate simple conditional probabilities • concepts of prior distribution, posterior distribution and conjugate prior distribution • derivation of posterior distribution for a parameter in simple cases • concept of a loss function • derivation of Bayesian estimates of parameters using simple loss functions • Explain what is meant by the credibility premium formula and describe the role played by the credibility factor • Explain the Bayesian approach to credibility theory and use it to derive credibility premiums in simple cases • Explain the empirical Bayes' approach to credibility theory and use it toderive credibility premiums in simple cases • Explain the differences between the two approaches and state the assumptions underlying each of them	

Reference Books:

Sr. No.	Title Author	Edition Year	ISBN Publisher
1.	ActEd Study Material Subject CT3	2018	Actuarial Education Company acted@bpp.com
2.	ActEd Study Material Subject CT6	2018	Actuarial Education Company acted@bpp.com
3.	John Freund's Mathematical Statistics with Applications by Miller, Miller	2003	131427067 Prentice Hall India
4.	Elementary Statistics by Mario Triola	2006	9780321369185 Prentice Hall
5.	Introduction to Mathematical Statistics by Hogg, McKean and Craig		ISBN-13: 978-0321795434 Pearson
6.	Statistical Methods by R. J. Shah	2010	Sheth Publishers
7.	Statistics by M.G. Diwan and R. Ramkrishnan	2003	Insurance institute of India

Syllabus: Actuarial Statistics 1B [Practical] No of Lectures - 30

Course Outcome

On successful completion of this course, student should be able to use scientific calculator, spreadsheet software (if required) to

- calculate point estimate and interval estimates of parameters under different distribution environments (Evaluate)
- calculate test statistic and perform a test of significance for various parameters under appropriate distributional environments (Evaluate, Analyse)
- interpret the results of the linear regression model and generalised linear models (Analyse)
- fit a linear regression model to a data set and interpret the output (Analyse)
- fit a generalised linear model to a data set and interpret the output(Analyse)
- compute Bayesian estimators (Analyse)

A student should carry out practical exercises to achieve the above mentioned competence.

Practical Examination: Total Marks 50

Theory and Practical marks scored by a student shall then be merged in the ratio of 2:1 to convert to a total of 100 marks.

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Nagindas Khandwala College (Autonomous)

Syllabus And Question Paper Pattern Of

First Year Semester I

4. Actuarial Accounting 1

Under Academic Autonomy and Credit, Grading and Semester System

With effect from Academic Year 2021-22

Syllabus: Actuarial Accounting 1

Course Objective

The aim of this course is to

- provide a basic understanding of corporate finance
- provide knowledge of the instruments used by companies to evaluate projects and raise finance

Course Outcome

On successful completion of this course, student should be able to

- understand how companies are governed and structured (Understand)
- suggest appropriate ways to finance a company (Analyse)
- understand how to calculate company's taxable income (Understand)
- evaluate projects (Evaluate)

Syllabus: Actuarial Accounting 1

Modules at a Glance

Sr. No.	Topics	No. of lectures
Module1	**Corporate Governance, Corporate Organization and Business Types**	15
Module2	**Financing of Corporates and Taxation:**	15
Module3	**Issue of Shares, Reward Policy for Shareholders, Mergers and Acquisition**	15
Module4	**Project Evaluation**	15
	Total	60

Detailed Syllabus

Module	Topics	No. of Lectures
1	**Corporate Governance, Corporate Organisation and Business Types**	**15**
	• purpose and process of regulating the financial reporting information of incorporated entities • key principles of corporate governance and the regulation of companies • relationship between finance and the real resources and objectives of an organisation • relationship between the stakeholders in an organisation(including lenders and investors) • role and effects of the capital markets • maximisation of shareholder wealth as the main goal of financial management in a company • problems relating to the maximisation of shareholder wealth in practice: social responsibility concerns, agency problems and divergent objectives • the strategies employed by managers to maximize shareholder wealth • determinants of value and the actions managers can take to influence value • the distinctive characteristics of different types of business structures: sole traders, partnerships, limited companies and limited liability partnerships as business entities • different types of loan and share capital • authorised and issued share capital • economic advantages and disadvantages of a limited company as a business entity • the main differences between a private and public company	
2	**Financing of Corporates and Taxation**	**15**

	• Types of medium term company finance:
	  ○ hire purchase
	  ○ credit sale
	  ○ leasing
	  ○ bank loans
	• Types of short term company finance:
	  ○ bank overdrafts
	  ○ trade credit
	  ○ factoring
	  ○ bills of exchange
	  ○ commercial paper
	• Alternative methods of raising finance outside the regular banking system including
	  ○ shadow banking
	  ○ direct project financing
	  ○ crowd-funding
	  ○ micro-finance
	• Basic principles of personal taxation of income and capital gains
	• Basic principles of corporate taxation
	• Different systems of company taxation from the points of view of an individual shareholder and the company
	• Basic principles of double taxation relief
	• Understanding of the characteristics of the principal forms of financial instrument issued or used by companies and the ways in which they may be issued.
	• Reasons a company might have for seeking a quotation on the stock exchange
	• The characteristics of
	  ○ debenture stocks
	  ○ unsecured loan stocks
	  ○ Eurobonds
	  ○ preference shares
	  ○ ordinary shares
	  ○ convertible unsecured loan stocks
	  ○ convertible preference shares
	  ○ warrants
	  ○ floating rate notes
	  ○ subordinated debt
	  ○ options issued by companies
	• The characteristics and possible uses by a non-financial company of:
	  ○ financial futures
	  ○ options
	  ○ interest rate and currency swaps	

3	**Issue of Shares, Reward Policy for Shareholders, Mergers and Acquisition:**	**15**

	• Methods of obtaining a quotation for securities:
	  ○ introduction
	  ○ placing
	  ○ offer for sale
	  ○ offer for sale by tender
	  ○ offer for subscription
	• New issues to existing shareholders:
	  ○ scrip issue
	  ○ rights issue
	• Role of underwriting in the issue of securities.
	• Factors to be considered by a company when deciding on its capital structure
	• Effect of the capital structure of a company on the market valuation of the company
	• Effect of taxation on the capital structure used by a company
	• Principal factors that a company should consider in setting dividend policy
	• Alternative ways of distributing profits, such as buybacks
	• Effect of the dividend policy on the market valuation of a company
	• Companies growth with the different ways of company restructuring
	• Relationship between growth and profitability
	• Constraints on a firm's growth
	• Motives for mergers and acquisitions
	  ○ Characteristics of a merger
	  ○ Methods of evaluating a target company
	  ○ Steps that a buyer will usually take in a leveraged buyout
	• Cost of Capital of a company
	  ○ Concept
	○ Impact of nature of investment projects
	• Weighted average cost of capital of a company	

4	**Project Evaluation**	**15**

	• Methods to determine the viability of a capital project
	• Cash flow projections and techniques to estimate cashflows
	• Methods commonly used to evaluate risky investments including simulation and certainty equivalents
	• Issues in establishing the required rate of return for a capital project
	• Factors underlying the choice of discount rate within project assessment including:
	  ○ the assumptions and limitations in the use of the weighted average cost of capital
	  ○ the allowance for leverage
	  ○ the allowance for risk
	• Methods for identifying the risks that may be present for different types of project
	• Techniques for ascertaining the probability of occurrence of different risks over varying timescales and the financial impact of occurrence
	• Techniques for ascertaining the distribution of the possible financial outcomes of a capital project	

Reference Books:

Sr. No.	Title Author	Edition Year	ISBN Publisher
1.	ActEd Study Material Subject CT2	2018	Actuarial Education Co. acted@bpp.com
2.	Accounting and financial fundamentals for nonfinancial executives by Robert Rachlin& Allen Sweeny.	1996	AMACOM, New York
3.	Accounting Fundamentals by William Ruland		0324023618 South-Western College Pub.

Nagindas Khandwala College (Autonomous)

B. Com. (Honours) in Actuarial Studies

Syllabus And Question Paper Pattern Of

First Year Semester I

4. Mathematics for Actuaries (Theory)-1

Under Academic Autonomy and Credit, Grading and Semester System

With effect from Academic Year 2021-22

Course Objective

The aim of this course is to

- provide a basic understanding of mathematical concepts needed for studying actuarial science

Course Outcome

On successful completion of this course, student should be able to

- use numerical methods to understand accuracies of calculations (Apply)
- apply matrix and determinants for solving equations (Apply)
- understand the basics of calculus to build on further (Understand)
- use basic algebraic concepts in actuarial modeling (Apply)
- apply finite differences and difference equations in actuarial applications (Apply)

Syllabus: Mathematics for Actuaries 1

Syllabus: Mathematics for Actuaries 1

Modules at a Glance

Sr. No.	Topics	No. of lectures
Module1	**Numerical methods**	15
Module2	**Matrices, Determinants and Elementary Calculus**	15
Module3	**Algebra**	15
Module4	**Finite Differences and their Applications**	15
	Total	60

Detailed Syllabus

Module	Topics	No. of Lectures
1	**Numerical methods**	**15**
	• Measures of Absolute and Relative Changes • Measures of Absolute and Relative Errors • Linearly interpolating an intermediate value of a function based on two given values • Simple iterative methods to solve a non-linear equation	
2	**Matrices, Determinants and Elementary Calculus**	**15**
	• Vector algebra with simple operations ➢ Matrix operations • Determinants and their applications • Mathematical constants & standard functions: ➢ Functions: x^n, a^x, e^x, ln x. Definition, basic properties, graphs. Absolute values, Minimum and maximum values. Concepts of limit and continuity	
3	**Algebra**	**15**
	• Solution of simple equations, including simultaneous equations (not necessarily linear) • Use of Matrix Algebra and Determinants in solving Linear Equations • Solution of quadratic equations • Solution of inequalities • Summation of terms (Σ) and Product of terms (π). • Summation of terms in Arithmetic Progression and Geometric Progression • Σr and Σr^2 where r represents a natural number ranging from 1 to n. • Binomial expansions of (a + b)n where n is a positive integer and (1 + x)p where p is a real number with condition for convergence.	
4	**Finite Differences and their Applications**	**15**

	• Operators: E, Δ, B. • Finite differences and their tables • Applications to estimation of missing number. • Newton's and Lagrange's Formulae • Applications to interpolation and extrapolations • Solution of Simple Difference equations • Their applications in Markov Chain and other problems	

Reference Books:

Sr. No.	Title Author	ISBN Publisher
1.	Higher Algebra Hall and Knight ISBN 9781402179655	Macmillan and Co., London
2.	College Algebra T G Kulkarni and Kelkar	Macmillan
3.	Calculus: Early Transcendentals James Stewart ISBN-13: 9780534393212	Brooks/Cole Pub Company.
4	Calculus James Stewart ISBN-13: 9780534393397	Thompson Learning

Nagindas Khandwala College (Autonomous)

Syllabus And Question Paper Pattern Of

First Year Semester I

5. R Programming and Analytics (Practical)

Under Academic Autonomy and Credit, Grading and Semester System

With effect from Academic Year 2021-22

Syllabus: R Programming and Analytics (Practical*)*

Course Objective

- Gain a foundational understanding of business analytics using R programming
- Master the R programming and understand how various statements are executed in R

Course Outcome

On successful completion of this course, student should be able to

- Gain an in-depth understanding of data structure used in R and learn to import/export data in R (Understand)
- Define, understand and use the various apply functions and DPLYP functions (Apply)
- Understand and use the various graphics in R for data visualization (Apply)
- Gain understanding of use of R for calculating statistical measures and interpret them (Understand)
- Apply hypothesis testing methods and regression models using R (Apply)
- Learn and use clustering methods including K-means, DBSCAN, and hierarchical clustering – all using R (Apply)

Syllabus: R Programming and Analytics (Practical*)*

Modules at aGlance

Sr. No.	Topics	No. of lectures
Module1	**Introduction**	15
Module2	**Getting Deeper in R**	15
Module3	**Advanced Concepts**	15
Module4	**Applications to various tools including (but not limited to)**	15
	Total	60

Detailed Syllabus

Module	Topics	No. of Lectures
1	**Introduction**	**15**
	• Big Data and Data Mining • Technology and Tools for Big Data mining, A framework for tackling Big Data Analytics Project • Introduction to Business Analytics • Introduction to R Programming	
2	**Getting Deeper in R**	**15**
	• R Data Structure • Apply Functions • Data Visualization • Data mining • Big Data Processing and Storage Systems, their integration with R	
3	**Advanced Concepts**	**15**
	• Classification • Clustering • Association • Predictive Modeling • Data Science and unstructured data analysis.	
4	**Applications to various tools including (but not limited to)**	**15**

	• Descriptive measures in Statistics • Estimation • Hypothesis Testing • Regression Analysis • Time Series Forecasting	

Reference Books:

Sr. No.	Title and Author	Edition Year	ISBN Publisher
1.	Beginning R : The Statistical Programming Language by Dr. Mark Gardener	2013	
2.	Statistics Using R by Purohit, Gore and Deshmukh	2008	Narosa Publications
3.	Actuarial Statistics- An Introduction Using R by Shailaja R Deshmukh	1st 2009	9788173716904 Universities Press
4.	Essential R For Data Analysis: Data manipulation and visualization using R for beginning and intermediate users	1st	PBR Books
5.	R for Data Science by Hadley Wickham		

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Syllabus And Question Paper Pattern Of

First Year Semester I

6. Financial Professionals' Skill Development Course

Under Academic Autonomy and Credit, Grading and Semester System

With effect from Academic Year 2021-22

Syllabus: ***Financial Professionals' Skill Development Course***

Course Objective

The aim of this course is to

- provide a basic understanding of concepts of mathematics, statistics, data analysis, English needed for embarking on study of a serious financial profession
- create interest in mathematics and its applications
- prepare for actuarial common entrance test of India

Course Outcome

On successful completion of this course, student should be able to

- apply principles of analytical approach to variety of quantitative problems (Apply)
- sharpen English communication skills (Create)

Syllabus: ***Financial Professionals' Skill Development Course***

Modules at a Glance

Sr. No.	Topics	No. of lectures
Module1	**Elementary Mathematics**	15
Module2	**Data Interpretation and Logical Reasoning**	15
Module3	**English**	15
Module4	**Recreational Mathematics**	15
	Total	60

Detailed Syllabus

Module	Topics	No. of Lectures
1	**Elementary Mathematics**	**15**
	Notation and standard functions Numerical Methods Algebra Differentiation Integration Vectors Matrices	
2	**Data Interpretation and Logical Reasoning**	**15**
	Interpretation of the given data in the form of Tables, Column Graphs, Bar Graphs, Line Charts, Pie Chart, Venn Diagrams, Caselets. Logical reasoning and analysis for Number and Letter Series, Calendars, Clocks, Cubes, Venn Diagrams, Binary Logic, Seating Arrangement, Logical Sequence, Logical Matching, Logical Connectives, Syllogism, Blood Relations	**,**
	English	**15**
	Vocabulary Based (Synonyms Antonyms) English Usage or Grammar Sentence Correction Cloze Passage Analogies or Reverse Analogies Jumbled Paragraph Meaning-Usage Match Summary Questions Verbal Reasoning Facts / Inferences / Judgements Comprehension	
4	**Recreational Mathematics**	**15**
	Kaprekar'sConstant Kaprekar numbers Self numbers Demlo numbers Harshad numbers Martin Gardner and his Puzzles Hardy-Ramanujan Number Some Gems from Mathematical Treasures - Lilavati of Bhaskara	

Reference Books:

Sr. No.	Title Author	ISBN Publisher
1.	The Pearson and Guide to Verbal Ability and Logical Reasoning for the CAT Editor: Nishit K. Sinha	
2.	Quantitative Aptitude for MBA Entrance Examinations Editor: R.S. Aggarwal	
3.	How to Prepare for Verbal Ability and Reading Comprehension for CAT by Arun Sharma and Meenakshi Upadhyay,	Mc Graw Hill
4	Gunjikar, K. R.; Kaprekar, D. R. (1939). "Theory of Demlo numbers" (PDF). *J. Univ. Bombay*. **VIII** (3): 3–9.	
5	Kaprekar, D. R. The Mathematics of New Self-Numbers Devalali (1963)nn: 19–20	
6	D. R. Kaprekar (1980–1981). "On Kaprekar numbers". *Journal of Recreational Mathematics*. **13**: 81–82	
7	Lilavati of Bhaskaracharya: A Treatise of Mathematics of Vedic Tradition	
8	Mathematical Treasures - Lilavati of Bhaskara by **Frank J. Swetz and Victor J. Katz**	MAA Publication, USA
9	A Mathematician's Apology, G H Hardy	
10	*"Hardy–Ramanujan Number"by Weisstein, Eric W.*	*MathWorld*.

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Syllabus And Question Paper Pattern Of

First Year Semester I

6. Operations Research

Under Aca6. demic Autonomy and Credit, Grading and Semester System

With effect from Academic Year 2021-22

Syllabus: Operations Research

Course Objective

The aim of this course is to

- provide a basic understanding of mathematical concepts needed for studying actuarial science

Course Outcome

On successful completion of this course, student should be able to

- learn how to formulate a mathematical model and its solution using graphical method and simplex method (Understand)
- apply techniques of solving two-player games (Apply)
- solve one-stage and multi-stage decision making problems (Analyse)
- understand and apply project management techniques (Apply)

Syllabus: Operations Research (Theory)
Modules at a Glance

Sr. No.	Topics	No. of lectures
Module1	**Linear Programming Problem**	15
Module2	**Game theory and Decision theory**	15
Module3	**CPM and PERT**	15
Module4	**Inventory Control**	15
	Total	60

Detailed Syllabus

Module	Topics	No. of Lectures
1	**Linear Programming Problem (LPP)**	**15**
	• Definion of LPP • Formulation from description of data • Graphical Method of Solution • Simplex Method of Solution	
2	**Game theory and Decision theory**	**15**
	➢ Two-person Zero Sum Games • Basic concepts and terminology Solution of Games using saddle point, dominance, algebraic method andgraphical method ➢ Decision Theory • Simple one-stage decision making problems using pay-off and opportunity cost measures • Multi-stage decision-making problems with the help of decision trees	
3	**CPM and PERT**	**15**
	Critical Path Method (CPM) • Concepts: Activity, Event, Network Diagram. • Construction of a Network Diagram. Node Relationship and Precedence Relationship. • Principles of Constructing Network Diagram. • Use of Dummy Activity. • Critical Path, Sub-critical Path, Critical and Non-critical Activities, Project Completion Time. • Calculation of EST, EFT, LST, LFT, Head Event Slack, Tail Event Slack, Total Float, Free Float, Independent Float and Interfering Float. Program Evaluation and Review Technique (PERT) • Three Time Estimates of PERT: Optimistic Time, Most Likely Time and Pessimistic Time • Expected Time of an Activity Using Three Time Estimates. • Difference between CPM and PERT. • Mean (Expected) Project Completion Time. • Standard Deviation and Variance of Activities. • Project Variance and Project Standard Deviation. • Probability regarding Project duration Resource Allocation Problems Crashing of Activities and their use in achieving least cost specified duration project schedules and Optimum Cost Schedule	
4	**Inventory Control**	**15**

	Concept of Inventory Problems, related costs. Deterministic models with finite/infinite replenishment rates and shortage cost. Derivation and Applications. Stochastic Models with discrete/continuous demand and order quantity. Derivation and Applications.	

Reference Books:

Sr. No.	Title Author	ISBN Publisher
1	Operations Research Techniques for Management, Kapoor V.K	Sultan Chand & Sons,7th.
2	Operations Research, R J Shah	Sheth Publishers,5th
3	Operations Research ,Kantiswarup, Gupta P.K. &Manmohan,	Sultan Chand & Sons,9th.
4	PERT and CPM: Principles and Applications, L S Srinath	Affiliated East-West Press (Pvt.) Ltd

Nagindas Khandwala College, Mumbai

(Autonomous)

Syllabus and Question Paper Pattern
of Courses of Bachelor of Commerce (Honours) in Actuarial Studies

First Year
Semester II

With effect from the academic year 2021-22

Nagindas Khandwala College(Autonomous)

Syllabus And Question Paper Pattern Of

First Year Semester II

1. Environmental Studies

Under Academic Autonomy and Credit, Grading and Semester System

With effect from Academic Year 2021-22

Syllabus: Environmental Studies

Course Objective

To provide a basic understanding of environment around us in terms of natural resources, institutions and people around us, changes appearing in the environment, measuring their impact, assessment of risk and some methods of managing such risks.

Course Outcome

On successful completion of this course, a student shall be able to

- Describe what is importance of environmental study
- State the natural resources around us
- Describe ecosystems and their characteristics
- Describe biodiversity and its significance
- Describe different types of pollution and their impact
- Discuss social issues and environment
- Describe how human population is affected by environmental issues
- Understand why actuaries are concerned with climate changes
- Describe actuarial and statistical models useful in assessing certain environmental risks and methods to deal with those risks

Syllabus: Environmental Studies

Modules at a Glance

Sr. No.	Topics	No. of lectures
Module1	Environmental Studies, Natural Resources and Ecosystems	07
Module2	Biodiversity and Its Conservation, Environmental Pollution and Social Issues and The Environment	06
Module3	Social Issues, Human Population and The Environment	07
Module4	Actuarial and Statistical Aspects	10
	Total	**30**

Detailed Syllabus

Module	Topics	No. of Lectures
1	**Environmental Studies, Natural Resources and Ecosystems**	**07**
	Definition, Scope, Importance, Need For Public Awareness - Institutions in Environment, People in Environment **Natural Resources:** Introduction, Renewable And Non-Renewable Resources - Natural resources and associated problems, Non-renewable resources, Renewable resources, Forest Resources **Ecosystems:** Concept of an ecosystem, Understanding ecosystems, Ecosystem degradation, Resource utilization, Structure and functions of an ecosystem, Producers, consumers and decomposers, Energy flow in the ecosystem. The water cycle, The Carbon cycle, The Oxygen cycle, The Nitrogen cycle, The energy cycle, Integration of cycles in nature, Ecological succession, Food chains, Food webs and Ecological pyramids, The ecological pyramids, Introduction, Types, Characteristic features, Structure and functions.	
2	**Biodiversity And Its Conservation, Environmental Pollution and Social**	**06**
	Biodiversity And Its Conservation: Definition, Genetic, Species, Ecosystem Diversity, Genetic diversity, Species diversity, Ecosystem diversity, Biogeographic Classification of India, Value of Biodiversity. **Environmental Pollution:** Definition, Causes, Effects And Control Measures of, Air Pollution, Air Quality Index, Water Pollution, Soil Pollution, Marine Pollution, Noise Pollution, Solid Waste Management: Causes, Effects And Control Measures. Role of Individuals In Pollution Prevention, Disaster Management: Floods, Earthquakes, Cyclones, Landslides.	
3	**Social Issues, Human Population and The Environment**	**07**
	Social issues and the environment From Unsustainable To Sustainable Development, Urban Problems Related To Energy, Water Conservation, Rain Water Harvesting, Water conservation, Resettlement And Rehabilitation Of People – Problems and Concerns. Preserving resources for future generations, The rights of animals. The conservation ethic and traditional value systems of India, Climate Change, Global Warming, Environmental Values, Valuing Nature, Valuing cultures, Social justice,	

	Human Population And The Environment: Population Growth, Variation Among Nations, Global population growth, Population Explosion – Family Welfare Program, Methods of sterilization, Urbanization, Environmental And Human Health, Environmental health, Climate and health, Infectious diseases, Water-related diseases, Risks due to chemicals in food, Cancer and environment, Human Rights, Equitable use of Resources, Women And Child Welfare, Role of Information Technology In Environment And Human Health.	
4	**Actuarial and Statistical Aspects**	**10**
	• Actuaries, Environmental Policy and the Public Interest: ○ Introduction - Why should actuaries be interested in the environment? ○ Climate Change and Investment Policy ○ Modeling the specific impact of climate change ○ RAMP (Risk Analysis and Management for Projects) methodology • Actuaries and climate change ○ Impact of climate change ○ Responses to climate change • Other actuarial aspects like ○ Agricultural insurance ○ Catastrophe risk ○ Capital market solutions including Carbon pricing / emissions trading, weather derivatives, catastrophic bonds ○ Impact modeling ○ Impact of Global Warming	

Reference Books:

Sr. No.	Title Author	Edition Year	ISBN Publisher
1.	Environmental Studies Erach Bharucha	2004	UGC
2.	Environmental Studies	2015	YCMOU
3.	Climate Sources for Actuaries by Mark Alberts		Society of Actuaries, USA
4.	Actuaries, Environmental Policy and the Public Interest By Nick Silver and Paul Dickinson	2003	Institute of Actuaries, UK

Nagindas Khandwala College(Autonomous)

Syllabus And Question Paper Pattern Of

First Year Semester - II

2. Actuarial Statistics 2A [Theory and Practical]

Under Academic Autonomy and Credit, Grading and Semester System

With effect from Academic Year 2021-22

Syllabus: Actuarial Statistics 2A [Theory]

Course Objective

The aim of this subject is to provide a strong background of mathematical and statistical modeling techniques that are of particular relevance to actuarial work, including time series analysis and its applications

Course Outcome

On successful completion of this subject, a student will be able to:

- describe and use statistical distributions for risk modeling
- describe the main concepts underlying the analysis of time series models
- describe and apply basic principles of machine learning

Syllabus: Actuarial Statistics 2A [Theory]

Modules at a Glance

Sr. No.	Topics	No. of lectures
Module1	**Random variables and distributions for risk modeling**	15
Module2	**Introduction to Copulas and Extreme Value Theory**	15
Module3	**Time Series Models-I**	15
Module4	**Advanced concepts and Applications of Time Series and Machine Learning**	15
	Total	60

Detailed Syllabus

Module	Topics	No. of Lectures
1	**Random variables and distributions for risk modeling**	**15**
	• Loss distributions, with and without risk sharing • statistical distributions suitable for modeling individual and aggregate losses and their properties • concepts of excesses (deductibles), reinsurance and retention limits • operation of simple forms of proportional and excess of loss reinsurance • derivation of the distribution and determination of corresponding moments of the claim amounts paid by the insurer and the reinsurer in the presence of excesses(deductibles) and reinsurance. • Estimate the parameters of a failure time or loss distribution when the data is complete, or when it is incomplete, using maximum likelihood and the method of moments. • Fit a statistical distribution to a dataset and calculate appropriate goodness of fit measures. • Compound distributions and their applications in risk modeling (including reinsurance) ○ construction of models appropriate for short term insurance contracts in terms of the numbers of claims and the amounts of individual claims ○ Compound Poisson distribution, its characteristics and its applications related to aggregate losses ○ derivation of the mean, variance, moment generating function and coefficient of skewness for compound Binomial, compound Poisson and compound Negative binomial distributions	
2	**Introduction to Copulas and Extreme Value Theory**	**15**
	• Copulas ○ copula as a multivariate distribution function which is a function of the marginal distribution functions of its variates and its implications for analysis ○ meaning of the terms dependence or concordance, upper and lower tail dependence and use of tail dependence in selecting a copula suitable for modeling particular types of risk ○ Gaussian copula and the Archimedean family of copulas • Extreme Value Theory ○ Extreme value distributions, suitable for modeling the distribution of severity of loss and their relationships Calculation of various measures of tail weight and interpretation of the results to compare the tail weights	

3	**Time Series Models-I**	**15**
	• Concepts underlying time series models ○ general properties of stationary, I(0), and integrated, I(1), univariate time series ○ stationary random series ○ a filter applied to a stationary random series ○ backwards shift operator, backwards difference operator ○ characteristic equation of time series and its roots • Basic properties of following time series models: ○ autoregressive (AR) ○ moving average (MA) ○ autoregressive moving average (ARMA) ○ autoregressive integrated moving average (ARIMA)	
4	**Advanced concepts and Applications of Time Series and Machine Learning**	**15**
	• Advanced concepts of time series ○ concept and properties of discrete random walks and random walks with normally distributed increments, both with and without drift ○ basic concept of a multivariate autoregressive model ○ co-integrated time series ○ Markov property of time series and illustrations ○ methodology to rearrange a univariate time series model as a multivariate Markov model. • Applications of time series models ○ identification, estimation and diagnosis of a time series model ○ the criteria for choosing between models and the diagnostic tests to be applied to the residuals of a time series after estimation ○ other non-stationary, non-linear time series models. ○ simple applications of a time series model, including random walk, autoregressive and co-integrated models as applied to security prices and other economic variables ○ deterministic forecasts from time series data, using simple extrapolation and moving average models, applying smoothing techniques and seasonal adjustment when appropriate (including Box-Jenkins methodology) • Elementary Principles and Applications of Machine learning ○ main branches of machine learning ○ illustrations of the types of problems typically addressed by machine learning ○ application of high-level concepts relevant to learning from data ○ examples of key supervised and unsupervised machine learning techniques ○ difference between regression and classification ○ difference between generative and discriminative models	

	○ use of appropriate software to apply machine learning techniques (e.g. penalised regression and decision trees) to simple problems ○ demonstrate an understanding of the perspectives of statisticians, ○ data scientists, and other quantitative researchers from non-actuarial backgrounds	

Reference Books:

Sr. No.	Title and Author	Edition Year	ISBN Publisher
1.	ActEd Study Material Subject CT6	2018	Actuarial Education Company acted@bpp.com
2.	Actuarial Mathematics Bowers, L. Newton, et. el.	2nd	ISBN 0938959468 Society of Actuaries
3.	ActEd Study Material Subject ST9	2018	Actuarial Education Company acted@bpp.com
4.	ActEd Study Material Subject CS2	2019	Actuarial Education Company acted@bpp.com

Nagindas Khandwala College (Autonomous)

Syllabus And Question Paper Pattern Of

First Year Semester II

2. Actuarial Statistics 2A [Practical]

Under Academic Autonomy and Credit, Grading and Semester System

With effect from Academic Year 2019- 20

Syllabus: Actuarial Statistics 2A [Practical]

(30 lectures)

Course Outcome

On successful completion of this course, student should be able to use scientific calculator, spreadsheet software, R studio (if required) to

- calculate moments and cumulative probabilities for loss distributions
- calculate the estimates of the parameters of a failure time or loss distribution when the data is complete, or when it is incomplete, using maximum likelihood and the method of moments
- fit a statistical distribution to a dataset and calculate appropriate goodness of fit measures
- calculate various measures of tail weight and interpret the results to compare the tail weights
- calculate sample autocorrelation coefficients and use them for estimating parameters in a time series model
- calculate forecasts based on time series models
- use appropriate software to apply machine learning techniques

A student should carry out practical exercises to achieve the above mentioned competence

Practical Examination: Total Marks 50

Theory and Practical marks scored by a student shall then be merged in the ratio of 2:1 to convert to a total of 100 marks.

Nagindas Khandwala College (Autonomous)

Syllabus And Question Paper Pattern Of

First Year Semester II

3. Actuarial Statistics 2B [Theory and Practical]

Under Academic Autonomy and Credit, Grading and Semester System

With effect from Academic Year 2021-22

Syllabus: Actuarial Statistics 2B [Theory]

Course Objective

The aim of this subject is to provide a strong background of mathematical and statistical modeling techniques that are of particular relevance to actuarial work, including stochastic processes and survival models and their application.

Course Outcome

On successful completion of this subject, a student will be able to:

- describe and apply Markov chains and Markov processes
- describe and apply techniques of survival analysis
- describe and apply methods of Graduation
- test statistically the graduated rates for appropriateness

Syllabus: Actuarial Statistics 2B [Theory]

Modules at a Glance

Sr. No.	Topics	No. of lectures
Module1	**Stochastic Processes and Markov Chains**	15
Module2	**Markov Processes and Their Applications**	15
Module 3	**Survival models**	15
Module 4	**Calculation of Exposed to Risk and Graduation**	15
	Total	60

Detailed Syllabus

Module	Topics	No. of Lectures
1	**Stochastic Processes and Markov Chains**	**15**
	• Description, classification and basic characteristics of stochastic processes ○ definition of a general stochastic process and a counting process ○ classification a stochastic process according to time and value and examples of each type ○ simple random walk ○ possible applications of mixed processes ○ characteristics: stationary and weakly stationary, Markov property, white noise, filtration • Markov chain and its Applications ○ essential features of a Markov chain model ○ Chapman-Kolmogorov equations that represent a Markov chain ○ stationary distribution for a Markov chain in simple cases ○ a system of frequency based experience rating in terms of a Markov chain and other simple applications ○ a time inhomogeneous Markov chain model and describe simple applications ○ use of Markov chain as a tool for modeling and show how	
2	**Markov Processes and Their Applications**	**15**
	• Markov Processes ○ definition, time homogeneous and time inhomogeneous cases ○ essential features of a Markov process model ○ definition of Poisson process, derivation of the distribution of the number of events ina given time interval, derivation of the distribution of inter-event times, and application of these results ○ derivation of the Kolmogorov equations for a Markov process with time independent and time/age dependent transition intensities ○ solution of the Kolmogorov equations in simple cases ○ simple survival models, sickness models and marriage models in terms of Markov processes and other simple applications	

	○ Kolmogorov equations for a model where the transition intensities depend not only on age/time, but also on the duration of stay in one or more states ○ sickness and marriage models in terms of duration dependent Markov processes and other simple applications ○ uses of Markov jump processes as a tool for modeling and show how they can be simulated	
3	**Survival models**	**15**
	• Concept of survival models • model of lifetime or failure time from age x as a random variable • consistency condition between the random variable representing lifetimes from different ages. • cumulative distribution function and density functions of the random future lifetime • survival function, the force of mortality or hazard rate and relationships between them • actuarial symbols ${}_tp_x$ and ${}_tq_x$ and derive integral formulae for ${}_tp_x$ in terms of force of mortality • Gompertz and Makeham laws of mortality • curtate future lifetime from age x and its probability function • the symbols e_x and e^0_x and an approximate relation between them • expected value and variance of the complete and curtate future lifetimes and derive expressions for them • Two-state model of a single decrement and compare its assumptions with those of the random lifetime model • Estimation procedures for lifetime distributions • ways in which lifetime data might be censored • the estimation of the empirical survival function in the absence of censoring, and what problems are introduced by censoring • Kaplan-Meier (or product limit) estimator of the survival function in the presence of censoring, its computation and estimate of its variance • Nelson-Aalen estimator of the cumulative hazard rate in the presence of censoring, its computation and estimate of its variance • Models for proportional hazards and their application to estimate the impact of covariates on the hazard • Cox model for proportional hazards, derivation of the partial likelihood estimate in the absence of ties, and the asymptotic distribution of the partial likelihood estimator • Derivation of Maximum likelihood estimators for constant transition intensities with a well drawn observational plan in respect of a finite number of individuals observed during a finite period of time, and other resulting statistics, including the waiting	

	times • their asymptotic joint distribution • the Poisson approximation to the estimator in the case of a single decrement	
4	**Calculation of Exposed to Risk and Graduation**	**15**
	• Estimation of transition intensities dependent on age (exact or census) ○ importance of dividing the data into homogeneous classes, including subdivision by age and sex ○ principle of correspondence and its fundamental importance in the estimation procedure ○ the data needed for the exact calculation of a central exposed to risk (waiting time) depending on age and sex ○ calculation of a central exposed to risk given the above data ○ estimates of transition probabilities, including in the single decrement model the actuarial estimate based on the simple adjustment to the central exposed to risk. ○ the assumptions underlying the census approximation of waiting times ○ concept of the rate interval ○ Develop census formulae given age at birthday where the age may be classified as next, last, or nearest relative to the birthday as appropriate, and the deaths and census data may use different definitions of age ○ Specify the age to which estimates of transition intensities or probabilities apply	
	• Graduation and graduation tests ○ Concept, need, objective of graduation and desirable characteristics of graduated rates ○ Methods of Graduation: Graphical method, Parametric formula method, Standard Table based method, Spline functions method ○ Graduation tests for ➢ smoothness ➢ adherence ▪ overall goodness ▪ consistent bias ▪ detecting the presence of individual ages where the fit is poor ▪ detecting the consistency of the "shape" of the crude estimates and the standard table ○ For each test describe: ➢ formulation of the hypothesis ➢ test statistic ➢ distribution of the test statistic using approximations where appropriate ➢ calculation of the test statistic and conclusion thereof • Describe how the above tests should be amended to allow for the presence of duplicate policies	

	• Mortality projection ○ the approaches to the forecasting of future mortality rates based on extrapolation, explanation and expectation, and their advantages and disadvantages ○ Lee-Carter, age-period-cohort, and p-spline regression models for forecasting mortality. ○ main sources of error in mortality forecasts	

Reference Books:

Sr. No.	Title and Author	Edition Year	ISBN Publisher
1.	ActEd Study Material Subject CT6	2018	Actuarial Education Company acted@bpp.com
2.	Actuarial Mathematics Bowers, L. Newton, et. el.	2nd	ISBN 0938959468 Society of Actuaries
3.	Survival models and their estimation	1988	Actex Publications
4.	Probability and random processes. by*Grimmett, Geoffrey; Stirzaker, David.*	3rd 2001	Oxford University Press
5.	Modeling, analysis, design, and control of stochastic systems. – *Kulkarni, Vidyadhar G.*	1999	Springner

Syllabus: Actuarial Statistics 2B [Practical] – No of Lectures -30

Course Outcome

On successful completion of this course, student should be able to use scientific calculator, spreadsheet software, R studio (if required) to

- calculate probabilities pertaining to simple stochastic process like simple random walk
- calculate multistep and steady-state probabilities using Markov Chain model
- calculate probabilities, expected waiting time in a state, expected time to reach from one state to another and other measures for Markov model
- calculation of probability, mean pertaining to lifespan based on different lifetime patterns
- calculate the Kaplan-Meier (or product limit) estimate of the survival function in the presence of censoring and estimate its variance
- calculate the Nelson-Aalen estimate of the cumulative hazard rate in the presence of censoring and estimate its variance
- apply Cox regression model to estimate proportionate hazards of two dissimilar lives
- compute maximum likelihood estimators for the constant transition intensities in Markov models using transition frequency data
- obtain estimates of central exposed to risk and hence estimates of transition probabilities in single decrement models
- carry out graduation by different standard methods
- carry out statistical tests of graduated rates for smoothness and adherence including tests for overall fit, presence of bias
- use an appropriate computer software package to apply Lee-Carter, age-period-cohort and p-spline regression models

A student to carry out practical exercises to achieve the above mentioned competence.

Practical Examination: Total Marks 50

Theory and Practical marks scored by a student shall then be merged in the ratio of 2:1 to convert to a total of 100 marks.

Nagindas Khandwala College (Autonomous)

Syllabus And Question Paper Pattern Of

First Year Semester II

4. Actuarial Accounting 2

Under Academic Autonomy and Credit, Grading and Semester System

With effect from Academic Year 2021-22

Syllabus: Actuarial Accounting 2

Course Objective

The aim of this course is to

- provide a basic understanding of accounting principles
- provide the ability to interpret the accounts and financial statements of companies and financial institutions
- provide an understanding of how to manage financial risk

Course Outcome

On successful completion of this course, student should be able to

- construct statement of income, balance sheet and cashflow statement
- analyse published accounts
- produce management information

Syllabus: Actuarial Accounting 2

Modules at a Glance

Sr. No.	Topics	No. of lectures
Module1	**Basic Concepts of Accounting**	15
Module2	**Construction of Accounting Statements, Insurance Company Accounts and Group Accounts**	15
Module3	**Measures of Comparison of Accounts**	15
Module4	**Constructing management information and evaluating working**	15
	Total	60

Detailed Syllabus

Module	Topics	No. of Lectures
1	**Basic Concepts of Accounting**	**15**

	• Why companies are required to produce annual reports and accounts
	• Value of financial reporting on environmental, social and economic sustainability
	• Fundamental accounting concepts which should be adopted in the drawing up of company accounts
	• Basic accounting items and their classification
	• Purpose of a:
	  ○ statement of financial position
	  ○ statement of comprehensive income
	  ○ cash flow statement
	  ○ notes to the accounts
	• Depreciation
	  ○ Purpose
	  ○ Methods of Calculation
	• Reserves
	  ○ types : Retained earnings, Revaluation reserve and Share Premium reserve
	  ○ how do they arise and how they may be used	

2	**Construction of Accounting Statements, Insurance Company Accounts and Group Accounts**	**15**

	• Trial balance
	• Construction of
	  ○ statements of financial position
	  ○ statements of profit or loss
	  ○ cash flow statements
	• Insurance company accounts:
	  ○ how different from other companies' account
	  ○ structure and content
	• Concepts of holding company, subsidiary company and associatedcompany
	• Purpose of consolidated accounts
	• Goodwill arising on consolidation of group accounts
	• Minority interest	

3	**Measures of Comparison of Accounts**	**15**

	• Measures useful to lenders:
	  ○ priority percentages and gearing
	  ○ interest cover and asset cover for loan capital
	• Measures useful to owners/investors:
	  ○ price earnings ratio	

	○ dividend yield ○ dividend cover ○ EBITDA ○ (Net) earnings per share • Understanding the possible effects of interest rate movements on a highly geared company. • Accounting ratios which indicate: ○ profitability ○ liquidity ○ efficiency • Shortcomings of historical cost accounting • Limitations in the interpretation of company accounts ○ How reported figures can be manipulated to create a false impression of a company's financial position	
4	**Constructing management information and evaluating working capital**	**15**
	• Working capital position of a company ○ Analysis of accounts receivables, accounts payables and inventory ratios ○ Evaluate policies for working capital management, including its individual elements ○ Methods for financing working capital ○ Analysis of the short term cash position of a company ○ Measures to manage the short term cash position of a company ○ Dividend sustainability • Forecasts and budgets as sources of management information. Their ○ Functions ○ Purpose ○ Basic examples	

Reference Books:

Sr. No.	Title Author	Edition Year	ISBN Publisher
1	ActEd Study Material Subject CT2	2018	Actuarial Education Co. acted@bpp.com
2	Accounting and financial fundamentals for nonfinancial executives by Robert Rachlin& Allen Sweeny.	1996	AMACOM, New York
3	Accounting Fundamentals by William Ruland		0324023618 South-Western College Pub.
4	Principles of Corporate Finance by Richard Brealey and Stewart Myers	2017	McGraw Hill

Nagindas Khandwala College (Autonomous)

B. Com. (Honours) in Actuarial Studies

Syllabus And Question Paper Pattern Of

First Year Semester II

4. Mathematics for Actuaries (Theory)-2

Under Academic Autonomy and Credit, Grading and Semester System

With effect from Academic Year 2020-21

Syllabus: Mathematics for Actuaries 2

Course Objective

The aim of this course is to

- provide a basic understanding of certain mathematical concept needed for studying actuarial science
- provide basics of machine learning

Course Outcome

On successful completion of this course, student should be able to

- apply differential calculus in actuarial analysis (Apply)
- apply integral calculus in actuarial analysis (Apply)
- understand certain more theories of calculus (Remember)
- understand basics of machine learning (Understand)

Syllabus: Mathematics for Actuaries 2
(Theory) Modules at a Glance

Sr. No.	Topics	No. of lectures
Module1	**Differential Calculus**	15
Module2	**Integral Calculus**	15
Module3	**More Applications of Calculus**	15
Module4	**Machine Learning**	15
	Total	60

Detailed Syllabus

Module	Topics	No. of Lectures
1	**Differential Calculus**	**15**
	• Derivative as rate of change. Derivative as gradient of a curve. • Derivative of simple functions: x^n, a^x, e^x, ln x. • Derivatives of sums, products, quotients and "functions of a function". • **T**he concept of a higher-order (repeated) derivative • Application of derivative to find the maximum or minimum value of a function over a • specified range • Identify the nature of stationary points • The meaning of a partial derivative, notations, evaluation. • Extreme values of functions of two variables	
2	**Integral Calculus**	**15**
	• Meaning of indefinite integral as the anti-derivative of a function and the meaning of a definite integral as the limit of a sum of infinitesimal elements. • The interpretation of a definite integral as the area under a graph • Integration of the standard functions xn, ax and ex. • Solution of indefinite and definite integrals by inspection, by identifying and applying an appropriate substitution, by integration by parts, by using simple partial fractions where the fractions initially have a quadratic denominator or by a combination of these methods • Determine when a definite integral converges	

3	**More Applications of Calculus**	**15**
	• State and apply Taylor series and Maclaurin series in their simplest form, including using these to determine the approximate change in a function where the argument is varied by a small amount. • Apply the Taylor series expansions for e^x and $\ln(1+x)$ and, in the latter case, determine when the series converges. • Concept of Differential equation and solution of dy/dx + Py = Q where P and Q are functions of x. Applications of this solution in Actuarial study.	
4	**Machine Learning**	**15**
	Understanding of elementary principles of Machine Learning and their applications • the main branches of machine learning • examples of the types of problems typically addressed by Machine Learning. Understanding in detail how to use appropriate software to apply Machine Learning techniques (*eg* penalised regression and decision trees) to simple problems	

Reference Books:

Sr. No.	Title Author	ISBN Publisher
1.	Calculus: Early Transcendentals James Stewart ISBN-13: 9780534393212	Brooks/Cole Pub Company.
2.	Calculus James Stewart ISBN-13: 9780534393397	Thompson Learning

Nagindas Khandwala College (Autonomous)

Syllabus and Question Paper Pattern Of

First Year Semester II

***5.* Advanced Excel with Macros [Practical]**

Under Academic Autonomy and Credit, Grading and Semester System

With effect from Academic Year 2021-22

Syllabus: Advanced Excel with Macros [Practical] – No of lectures -60

Course Objective

This course is aiming at providing grounding in Excel and its advanced features including various **Excel** functions useful in actuarial analytics and enable building Excel macros using visual basic.

Course Outcome

On successful completion of this course, student should be able to

- Demonstrate knowledge of Utility, Specifications
- Creating and Operating on worksheets: Entering data, editing data, Window view controls, working with cells and ranges, Introducing Tables, formatting worksheets, using and creating Templates, printing from worksheets
- Working with formats and functions: Introducing formulas and functions
- Creating formulas using functions useful for text manipulation, date and time related applications, counting and summing, formulas to LookUp values, useful for financial and statistical applications and formulas with array functions
- Creating charts and graphics: create and edit charts of the following types: Column, Bar, Line, Pie, XY charts
- Use Advanced Features: Creating and using outlines, linking and consolidating worksheets, sharing data with other applications, analyzing data using MS Query with external database files, performing what-if analysis, analyzing data using Goal Seek and Solver
- Demonstrate Programming Ability in EXCEL with VBA using VBA sub-procedures and VBA functions, Create VBA Macros, record actions to create them, write VBA Code.

A student to carry out practical exercises (particularly related to actuarial work) to achieve the above mentioned competence.

Reference Books:

Sr. No.	Title Author	Year	ISBN Publisher/Seller
1.	2016 Microsoft Excel Bible, John Walkenbach	2016	Wiley
2.	Professor Teaches Word, Excel, & Power Point 2010	2010	Individual Software, Inc.
3.	Learn Excel 2019 Essential Skills with the Smart Method by Mike Smart	2018	www.amazon.com
4.	Excel VBA and Macros: Programming Basics for Absolute Beginners by Philippe A. Louis	2018	Philippe A. Louis Sold by Amazon Asia- Pacific Holdings Private Limited

Nagindas Khandwala College (Autonomous)

B. Com. (Honours) in Actuarial Studies

Syllabus And Question Paper Pattern Of

First Year Semester II

6. Python Programming (Practical)

Under Academic Autonomy and Credit, Grading and Semester System

With effect from Academic Year 2021-22

Syllabus: Python Programming (Practical)

Course Objective

The aim of this course is to

- provide a basic understanding of python programming

Course Outcome

On successful completion of this course, student should be able to

- Install Python and write the first program (Understand)
- describe the basics of the Python programming language (Remember)
- use variables to store, retrieve and calculate information (Apply)
- Utilize core programming tools such as functions and loops (Analyse)

Syllabus: Python Programming (Practical)
Modules at a Glance

Sr. No.	Topics	No. of lectures
Module 1	**Python Programming**	15
Module 2	**Data Mining, Data Pre-processing and Cleaning**	15
Module 3	**Exploratory data analysis using Python**	15
Module 4	**Some key Application areas**	15
	Total	60

Detailed Syllabus

Module	Topics	No. of Lectures
1	**Python Programming**	**15**
	Understanding the features and the uses of the following**:** • Introduction to Python Editors & IDE's (Jupyter, Spyder, pycharm, etc…), • Custom environment settings • Basic data types -numeric, string, float, tuples, list ,dictionary ,sets and their operations • Control flow (if-elif-else), loops (for, while) • Inbuilt functions for data conversion • Writing user defined functions • Concepts of packages/libraries – important packages like NumPy, SciPy, Scikit-learn, Pandas, Matplotlib, Seaborn, etc., installing and loading packages • Reading and writing data from/to different formats, simple plotting, functions, list comprehensions, database connectivity, playing with Date Format	
2	**Data Mining, Data Pre-processing and Cleaning using Python**	**15**
	Data Mining • Concept, Relevance in industry, • Statistical learning versus machine learning, types and phases of analytics Data Pre-processing and Cleaning • Data manipulation steps (sorting, filtering, duplicates, merging, appending, subsetting, derived variables, data type conversions, renaming, formatting, etc.) • Normalizing data, sampling, missing value treatment, outliers	

3	**Exploratory data analysis using Python**	**15**
	• Data visualization using matplotlib, seaborn libraries • Creating graphs (bar/line/pie/boxplot/histogram, etc.) • Summarizing data ➢ descriptive statistics ➢ univariate analysis (distribution of data)	

	➢ bivariate analysis (cross tabs, distributions and relationships, graphical analysis)	
4	**Some key Application areas**	**15**
	Some key areas covered under where coding in Actuarial can be used are: • Calibrating the model parameters • Stochastic simulations • Front-ending the model usage (User interface)	

Reference Books:

Sr. No.	Title Author	ISBN Publisher
1.	Python for Everybody Dr. Charles R. Severance	Brooks/Cole Pub Company.
2.	Head First Python Paul Barry	O'REILLY
3.	Data Mining: Concepts and Techniques" by Han	
4.	Data Warehousing" by Reema Thareja	
5.	Python Essential Reference David Beazley	ISBN: 0672329786Addison-Wesley Professional
6.	The Python Language Reference Manual Guido van Rossum, and Fred L. Drake, Jr. (Editor)	ISBN: 1906966141 Network Theory Ltd,

Nagindas Khandwala College (Autonomous)

B. Com. (Honours) in Actuarial Studies

Syllabus And Question Paper Pattern Of

First Year Semester II

6. Financial Planning

Under Academic Autonomy and Credit, Grading and Semester System

With effect from Academic Year 2020-21

Syllabus: Financial Planning

Course Objective

The aim of this course is to

- provide a basic understanding of liabilities of an individual
- provide features of different asset classes
- educate the students on the importance of thrift and equipping them with the skills of planning and budgeting for a financially secure future.

Course Outcome

On successful completion of this course, student should be able to

- set financial goal (Remember)
- identify liabilities (Understand)
- understand the return and risk characteristics of different asset classes (Understand)
- make investment decisions (Analyse)
- plan and manage debts (Analyse)
- identify financial risks and estimate their impact (Understand)
- manage financial risks (Analyse)

Syllabus: Financial Planning

Modules at a Glance

Sr. No.	Topics	No. of lectures
Module1	Money Management	15
Module2	Financial Goal Setting	15
Module3	Investments	15
Module4	Planning and Managing Debt, Financial Risk Management	15
	Total	60

Detailed Syllabus

Module	Topics	No. of Lectures
1	**Money Management**	**15**
	• Process of financial planning • Key component of financial planning • Financial Myths • Keep records of Assets and liabilities • Understand Financial Position • Budget Your expenses and estimate liabilities • Determine savings that can be invested	
2	**Financial Goal Setting**	**15**
	• Describe your goal • List common financial goals • Quantify your goal • Define the timeline • Identify your financial situation and prioritize your financial goals accordingly	
3	**Investment**	**15**
	• Understand investment needs • Identify needs of withdrawals • Explore different asset classes and understand their risk and return profiles • Do fund allocation for different asset classes • Plan your portfolio • Balance your portfolio • Track your investment portfolio • Review your portfolio based on performance	
4	**Planning and Managing Debt, Financial Risk Management**	**15**
	• Critically view the need to borrow • Understand the parameters before taking a Loan • Record maintenance of debts • Dos and donts of debt management • Understanding of Financial risks and Vulnerability to these risks • Ways to check and reduce these vulnerabilities • Identify the financial risks you may have to face • Emergency Fund • Insurance • Cash Management • Tax Planning	

Reference Books:

Sr. No.	Title Author	ISBN Publisher
1.	Financial Planning by Swapna Mirashi	ACADEMIC FOUNDATION in association with RBI
2.	Financial Planning: AReady Reckoner by Madhu Sinha	

Examination Pattern

40 Marks Continuous Evaluation, 60 Marks Semester-End Examination

[1] **For a Theory Course : Total 100 Marks**

a. Continuous Internal examination shall carry 40% weight (40 marks). It would involve a written test (20 marks), an Assignment or Power Point Presentation (15marks), and Class participation (5 marks).

b. External examination of 2 hours' duration shall carry 60% weight (60 marks). It shall have 4 questions each with 15 marks. Internal options may be present.

c. In the theory examination, a candidate is permitted to use a designated, non-programmable scientific calculator and a specified Actuarial Tables Book.

d. Passing shall be independent in Internal Component called Continuous Internal Evaluation (CIE) and External Component called End Examination (EE).

A student must score at least 40% marks in each component in order to pass in the course.

[2] **For a Practical Course: Total 100 Marks**

a. Continuous Internal examination shall carry 40% weight. It would involve Journal assessment (35% weight) and class participation (5% weight).

b. End examination carrying 60% weight shall be of 3 hours. The examination will involve Viva (20% weight) and an end-exam activity (40% weight). The examiners shall evaluate the performance based on actual working (20% weight) and end- results (20% weight).

c. The practical examination shall be evaluated by one external examiner and one internal examiner.

d. In this practical examination, a candidate is permitted to use a designated, non-programmable scientific calculator, a computer with Excel, R software and a specified Actuarial Tables Book.

A student shall be considered to have PASSED if he/she obtains at least 40% marks in each of CIE and EE component.

Nagindas Khandwala College (Autonomous)

MKES's Nagindas Khandwala College (Autonomous),
Gate No 5, Bhavishya Bharat Campus, S. V. Road, Malad (West)
Mumbai-400 064

Program Code: UHCAS

Bachelor of Commerce (B.Com.) (Honours) Actuarial Studies

Three Year Integrated Honours Programme

Six Semesters

Course Structure

Under Choice Based Credit, Grading and Semester System

To be implemented from Academic Year- 2020-2021

Progressively

INDE X

1. Preamble

Actuarial Profession & Increasing demand for Actuaries

The profession of Actuaries was not sufficiently ventured in the past in India due to lack of awareness. The core of actuarial work lies within insurance. Since Insurance industry in India was nationalized for long from 1956-1999, Actuarial studies as a profession could not develop and prosper. With the opening up of the Indian economy and globalization, demand of actuaries increased many-fold in India. The demand of actuaries is rising world over in the sphere of enterprise risk management. Actuaries evaluate, manage and advise on all types of quantifiable risks (including financial, operational financial risks scientifically. They are considered to be the best risk managers as they use their knowledge of business and economics, together with their understanding of probability theory, statistics and investment theory, to provide strategic, commercial and financial advice. Actuaries are the only professionals who focus on estimation of uncertain future liabilities. Only qualified actuaries can certify such liabilities across the globe. Actuarial knowledge has a critical utility in data analytics and enterprise risk management.

Speaking at the Virtual Actuarial Conclave 2021, on 10th March,2021, IRDAI Chairman Subash Chandra Khuntia said: "If we look at the number of actuaries India has, it is not adequate for a country of our size. At present, we have only 458 full-fledged actuaries."

"Looking at the number of insurance companies we have and the size of our insurance business, which is 1.7 per cent of the global insurance industry and considering the fact that we have 60,000 actuaries globally, I think we should at least aspire to have 1,000-1,200 actuaries in the country as soon as possible," he added. He mentioned that actuaries are needed for insurance sector, banking sector as well as other financial sectors.

Job of Actuaries in the world is considered to be the Best job, mostly it ranks in the top 5 jobs (often Ranked #1) for the last 4 decades. With risk-based capital regime on the anvil, it is estimated that there will be a 30-40 percent increase in number of actuarial positions required by insurers. Demand of actuaries is steadily growing in data analytics. Greater demand would emerge when the industries in India begin employing actuaries for their

risk management function. Globally, majority of actuaries are engaged in risk management.

This Bachelor of Commerce (Honours) – Actuarial Studies Degree Program is designed keeping in mind the latest curriculum of the actuarial profession (that has come in force in 2019) and the skills needed to become job-ready in the field of actuaries and analytics. Detailed coverage of all aspects of the profession will provide students the right blend of knowledge and skills along with Global exposure.

1.1 About Khandwala College:

Khandwala College is a multi-faculty institution (Estd. 1983), affiliated to University of Mumbai. It offers 13 UG, 5 PG, 4 Add On, 3 Ph. D programs with 9 Departments and 2 Research Centresimparting education to more than 6500 students. The **Vision** of the institute includes Education for all, Education for the youth and Education for the future of our country.

The **Mission** is to serve the society at large and students belonging to linguistic minority in particular with commitment, dedication and devotion. The **Quality Policy** includes commitment towards imparting **Quality Education to youth**, enabling them to **develop right attitude**, **professional competence** and inculcating right **ethical values**.

The institution has been awarded **"A"** Grade (Third Cycle) by National Assessment and Accreditation Council, **Best College** by University of Mumbai (2012), **lead college** for a cluster of colleges, Educational Excellence Award by Indus Foundation, USA and **Best Ensemble Faculty (Academic Brilliance Awards – 2013)** by Education Expo TV's Research Wing for Excellence in Professional Education & Industry and ISO 9001:2015 certified by TUV Nord. We have been awarded **IMC Ramkrishna Bajaj National Quality Commendation Certificate** in 2013-14. Our college has been awarded Autonomous status from 2016. Khandwala College, as an Autonomous College; is offering a new **Bachelor of Commerce (Honours) Programme Actuarial Studies as a Three Year Integrated Programme –** with Six Semesters *Course Structure* - Under Choice Based Credit, Grading and Semester System**.**

1.2 Vision and Mission of Khandwala College

Vision:

- Education for all
- Education for the youth
- Education for the future of our country

Mission The college's focus is on the future of our students irrespective of their gender and place in society. Every student is like a flame reaching out to the brightness of the sun i.e. the bright future of India.

2 Objectives

This program of B. Com. (Honours) - Actuarial Studies is structured to provide graduates with practical skills required in international actuarial field. The main objective of B. Com. (Honours) - Actuarial Studies Program are:-

- To provide intensive theoretical & practical knowledge in all aspects of risk management.
- To provide an integrated perspective of management functioning along with a good amount of exposure to real life cases / technical knowhow on crucial aspects of Insurance products pricing and reserving
- To produce bachelors with a strong background in Mathematics, Statistics, Economics, Finance and Analytics to deal with Data Analysis in the areas of Financial Sector such as Insurance, Banking, Capital Market and other Financial Applications in view of sustained growth envisaged in Insurance Industry and KPO industry at large in the Financial sector.
- To develop participants' competencies to identify the possibility of a bad event, or a catastrophe; evaluate a solution to minimize the possibility of said bad event, or catastrophe, from occurring and also analyze the losses, that the risk might bring about, and devise solutions to reduce its consequences to the economy.
- To make program participants job-ready in the profession of actuaries and analytics.
- To provide expert's knowledge to undertake Actuarial profession and become a catalyst in the process of becoming actuary.

2.1 Program Outcome:

2.1 Program Outcome: On successful completion of this program, a participant shall be able to

PO1: Comprehensive Knowledge: demonstrate a capability of executing comprehensive knowledge and understanding of Mathematics, Statistics, Economics, Finance and Analytics to deal with Data Analysis in the areas of Financial Sector such as Insurance, Banking, Capital

Market and other Financial and undertake professional examinations in the subjects of CS1A, CS1B, CS2A, CS2B, CM1A, CM1B, CM2A, CM2B, CB1, CB2, CB3, CP2, CP3, SP1, SP2, SP4, SP5, SP7 of Institute and Faculty of Actuaries, UK and equivalent subjects of Institute of Actuaries of India.

PO2: **Communication Skill:** communicate problems in business and work towards their solutions

PO3: **Critical Thinking and Problem Solving**: demonstrate ability to think critically and analyse and synthesize data and derive inferences for valid conclusion by developing an integrated perspective of management functioning along with a good amount of exposure to real life cases / technical knowhow

PO4: Research and Projects: ability to search for, locate, extract, organise, evaluate, and use or present information that is relevant to a particular topic and work independently as well as in team on diverse projects and ensure detailed study of various facets of Finance and Business

PO5: ICT Skills: illustrate capability to use various softwares such spreadsheet, R programming, Python programming for exploring, analysis, and using the information or business purposes as a part of application of ICT

PO6: Risk Assessment and Risk Management: calculate the probability of a loss event, or a catastrophe; evaluate a solution to minimize the probability of said loss event, or catastrophe, from occurring and also analyze the losses that the risk might bring about, and create solutions to reduce its consequences to the economy (i.e. risk management).

PO7: Moral and Ethical Awareness: ascertain unethical behaviour, falsification, and manipulation of information

3. Eligibility, Selection and Admission Criterion:

Candidates for being eligible for admission to the three-year course leading to the Degree of Bachelor of Commerce (Honours) – Actuarial Studies, shall be required to have passed the Higher Secondary School Certificate Examination (10+2) or equivalent qualification from a recognized Board/ University or Body recognized as equivalent thereof by the Senate of the University, with minimum 50% aggregate marks or equivalent in any Stream.

3.1 EligibilityCriterion:

- Std. XII passed in any discipline with 50% or more marks on the aggregate and having English as a subject
- Good Communication Skills

3.2 Selection & Admission Criterion for Eligible Candidates:

- The interested students shall register for Aptitude Test and Interview.
- Reservations as per University rules will be applicable.

The admission of students shall be based on

- Academic and non- academic credentials till date
- Performance in Aptitude Test [comprising of questions in Mathematics/Statistics, English, Logical Reasoning, Analytical Ability], and
- Performance in Personal Interview

3.3 Eligibility for the Award of the Degree:

A candidate shall be eligible for the award of the Degree only if he / she has undergone the prescribed course of study in Khandwala College affiliated to the University for a period of not less than three academic years, passed the examinations of all the Six Semesters earning 140 credits with letter grade of D or higher (i.e. O/ A+/A/ B+/B/C/D) in core.

3.4 Intake Capacity

One Division with minimum 60 Students in the first year.

3.5 Fee structure

The total fees for B.Com. (Honours) Actuarial Studies will be Rs. 1,50,000 p.a.

4 Ordinances & Regulations for B. Com. (Honours) Actuarial Studies

4.1 General Guidelines:

The Credits are defined in terms of the learner's hours which are divided into two parts such as Actual and Notional. The value of a particular course can be measured in number of Credit Points. The value of One (01) Credit is equal to 15 Hours of learners' load.

The scheme of Examination shall be divided into TWO parts i.e. Continuous Internal Evaluation including Assignment, Projects, Seminars, Case Studies and Class Tests which will be of 40 marks and the Semester End Examinations which will be of 60 marks. The semester wise Credit Points will be varied from course to course but the value of Credits for Under-Graduate Programme shall be of 140 Credits (including 8 extra credits under autonomy).

Scheme of Total Credits

Sr. No.	**Year**	**Credits**
1	Year 1	44
2	Year 2	44
3	Year 3	44
	Total Credits from Academics	132
	Additional Credits for 2 Certifications (4*2)	8
	Total Credits for Award of Degree	140

List of Certifications for Additional Credits

- The courses offered by SoA- USA, CAS-USA, IFoA-UK, IAI-India at relevant time
- IBM-Big Data Analysis, and
- Other Options with Prior Approval by the Faculty

4.2 Credit Based Evaluation System Scheme of Examination

For all 6 semesters, the performance of the learners shall be evaluated into two components. The first component shall carry 40% marks which will be a Continuous Internal Evaluation while the second component shall carry 60% marks at semester end examination.

The allocation of marks for the Continuous Internal Evaluation 40% and Semester End Examination 60% are as shown below:

Structure of Continuous Internal Evaluation – 40% Weight- 40 Marks

Sr. No.	**Particulars**	**Marks**
1	Two periodic class tests held in the given semester (Best of the TWO) OR A single class test mid-way during the semester	20
2	Subject specific Term Work Module/assessment modes – as decided by the department in the beginning of the semester (like Extension/field/experimental work, Short Quiz; Objective test, lab practical, open book test etc. and written assignments, Case study, Projects, Presentations, Posters and exhibits etc. for which the assessment is to be based on class presentations wherever applicable)	15
3	Active participation in routine class instructional deliveries (and in practical work, tutorial, field work etc. as the case may be)	5
Total		40

Semester End Examination will be organized after all modules of the course are taught in the class. It will be a written examination / or as per the needs of the course a practical examination or a combination of both. This examination will be for 60% weight. For all Courses having Practical and Theory Component, Examination will be conducted for total 150 marks, (100 marks for Theory and 50 marks for Practical) which would then be

converted into 100 marks.

The assessment of Continuous Internal Evaluation and Semester End Examination as mentioned above for the Semesters I to VI shall be processed by the College and shall issue the grade cards to them after the conversion of marks into grade as the procedure mentioned below.

To pass a course, the learners shall have to obtain a minimum of 40% marks in aggregate for each course where the course consists of Continuous Internal Evaluation & Semester End Examination. The learner shall obtain minimum of 40% marks (e.g. 16 out of 40) in the Continuous Internal Evaluation and 40% marks in Semester End Examination (e.g. 24 Out of 60) separately, to pass the course and minimum of Grade D in each project, wherever applicable, to pass a particular semester. A learner will be said to have passed the course if the learner passes both the Continuous Internal Evaluation & Semester End Examination.

Passing Standards

Grade	Marks%	Grade Points
O	80 & Above	10
A+	70 to 79.99	9
A	60 to 69.99	8
B+	55 to 59.99	7
B	50 to 54.99	6
C	45 to 49.99	5
D	40 to 44.99	4
F	Less than 40	0

4.3 Carry Forward of The Marks in Case The Learner Gets 'F' Grade in One Or More Subjects:

- A learner who PASSES in the Continuous Internal Evaluation Examination but FAILS in the Semester End Examination of the course shall reappear for the Semester End Examination. Marks for Continuous Internal Evaluation shall be carried over and he/she shall be entitled for grade obtained by him/her on passing.

- A learner who PASSES in the Semester End Examination but FAILS in the Continuous Internal Evaluation of the course shall reappear for the Continuous Internal Evaluation Examination of that course. However, his/her marks of the Semester End Examination shall be carried over and he/she shall be entitled for grade obtained by him/her on passing.
- For Courses without practical: In case of a learner who is reappearing for the Continuous Internal Evaluation Examination, the examination will consist of two projects of 20 marks each.

4.4 Allowed to Keep Terms (ATKT) Facility:

As per University rules and regulations

Additional Examinations:

A. Continuous Internal Evaluation: As per University rules and regulations Class test or assignment for Continuous Internal Evaluation as per University rules and regulations

B. Semester End Examinations: As per University rules and regulations

Eligibility to Appear for Additional Semester End Examination:

As per University rules and regulations

Mode of Conduct of Semester End Additional Examination:

As per University rules and regulations

4.5 Evaluation of Projects (Wherever Applicable)

- A learner who PASSES IN ALL THE COURSES BUT DOES NOT secures minimum grade of D in projects as applicable, has to resubmit a fresh project (if required even repeatedly) till he/she secures a minimum of grade D. His/her marks in the theory papers that the learner has passed

will be carried forward and he/she shall be entitled for grade obtained by them on passing.

- The evaluation of project and viva-voce examination shall be by award of grade in the ten point scale.
- A learner shall have to obtain minimum of grade D (or its equivalent marks) in project evaluation and viva voce taken together to obtain 40% marks in project work.

4.6 Calculations of GPA & SGPA

As per University rules and regulations

5 Teaching Methodology

5.1 Classroom Sessions:

- Regular Lectures: Lectures shall be delivered by experienced faculties along with vising faculties and experts from the Industry.

- Assignments & Projects: Shall be assigned at regular intervals of the course. It offers an opportunity for students to meet, interact and collaborate with the experienced people from the industry.

- Knowledge Workshops and Industry seminars: Shall be organized at regular intervals to keep the students informed about the latest developments in the Industry. These workshops will be uniquely designed with a focus on practical industry – relevant topics.

- Simulated Events: Shall be conducted to get the real feel of organizing and managing an activity like risk analysis in Investments, in insurance business etc. The exercise gives the student's an opportunity to identify the finer nuances of industry thereby helping them to identify key success factors and areas of improvement.

5.2 Guest Lectures and Case Studies:

- **Guest Lectures**: Eminent people from the industry shall be invited as guest speakers to impart lessons and their rich experiences on various fields related to areas of actuary to the student. They also focus on imparting training around management concepts that have today become essential skills to carve a niche in the industry.
- **Case Studies**: Case studies highlighting various practical and situational issues shall be regularly discussed during classroom sessions. The discussion caters towards identifying what went wrong in the case and what could have been done

in a better manner, this helps train students to handle such situations in the future. The exercise also improves the analyzing and analytical of our students.

5.3 Innovative & Interactive Learning Technology

- **Educational wikis**: It keeps track of education – oriented wikis, establishes constructive interactions with them, and researches their technology, activity, culture, processes and impact.

- **Creative Presentation Ideas**: Prezi is a powerful communication and presentation tool that aims to replace Power point Presentation. Equipping students with the knowledge of this tool helps in preparing them to adapt easily to every changing dynamics of the corporate world.

- **CREATE through Technology**:

Communication and Collaboration: Google Apps provides students a chance to learn how to use webmail services, calendar (shared calendaring), G-Talk (instant messaging and voice/video chat) and Drive (online document creation & sharing). Education through Blogs: A powerful and interactive medium for learning. Ideal to educate, discuss and share innovative ideas across a large and diverse set of audiences.

- **Unparalleled Internships & Practical Training**

Students at Khandwala College get opportunities to participate in National & International Events round-the-year. They get Practical Training during internship.

In-House Events: Students are provided with an opportunity to work on conferences and seminars organized in-house right from the start to finish, to provide them with hands-on experience, which helps them to gain excellent event organization skills

6 Board of Studies

Sr. No.	Category	Name	Affiliation
1	Chairman	Dr. Moushumi Datta	Nagindas Khandwala College, Mumbai
2	Special Invitee	Dr. Ancy Jose	Nagindas Khandwala College, Mumbai
3	Special Invitee	Dr. Varsha Ainapure	Nagindas Khandwala College, Mumbai
4	Entire faculty of each Specialisation	Prof. Rajendra Shah Mrs. Purnima Shah Dr. Mrinalini Kohojkar	Nagindas Khandwala College, Mumbai
5	Subject experts from outside the parent university (2) *	(i) Dr. Arshia Kaul Assistant Professor	Anil Surendra Modi school of commerce, NMIMS, Mumbai
		(ii) Dr. K. Sriram	FIA of UK, India(FIAI), Visiting Faculty at IIM (B)
6	Expert nominated by the Vice-chancellor (1) **	DR. Dr. Annapurna Shankarnarayanan	Associate Prof. & Vice Principal (Arts) St. Xavier's College, Autonomous, Mumbai
7	Representative from industry/corporate sector/allied area relating to placement (1)	Mayur Ankolekar	FIA of UK, Consulting Actuary, Ankolekar & Co
8	Postgraduate meritorious alumnus ***	NA	NA
9	Chairman, with the approval of the Principal, may co-opt (a) Experts from outside the college whenever special courses of studies are to be formulated. (b) Other members of staff of the same faculty.	NA	NA

7. Curriculum Framework for *Bachelor of Commerce (B.Com.) (Honours) Actuarial Studies*
Under Choice Based Credit, Grading and Semester System

Course Structure

FIRST YEAR

(To be implemented from Academic Year- 2020-2021)

No.	Semester I		Credits	No.	Semester II		Credits
Ability Enhancement Compulsory Courses (AECC)				***Ability Enhancement Compulsory Courses (AECC)***			
1	Foundation Course **2011UCHAFC**	AECC-1	3	1	Environmental Studies **2021UCHAES**	AECC-2	3
Core Courses (CC)				***Core Courses (CC)***			
2	Actuarial Statistics 1A [Theory and Practical] **2012UCHAAS**	CC-1	4+2	2	Actuarial Statistics 2A [Theory and Practical] **2022UCHAAS**	CC-3	4+2
3	Actuarial Statistics 1B [Theory and Practical] **2013UCHAAS**	CC-2	4+2	3	Actuarial Statistics 2B [Theory and Practical] **2023UCHAAS**	CC-4	4+2
Discipline Specific Elective (DSE) Courses				***Discipline Specific Elective (DSE) Courses***			
4	Any <u>one</u> from DSE Group A • Actuarial Accounting 1 • Mathematics for Actuaries 1 **2014UCHAAC/MA**	DSE-1	3	4	Any <u>one</u> from DSE Group A • Actuarial Accounting 2 • Mathematics for Actuaries 2 **2024UCHAAC/MA**	DSE-2	3
Skill Enhancement Compulsory Courses (SEC)				***Skill Enhancement Compulsory Courses (SEC)***			
5	R Programming [Practical] **2015UCHARP**	SEC-1	4	5	Advanced Excel with Macros [Practical] **2025UCHAEX**	SEC-2	4
	TOTAL		**22**		**TOTAL**		**22**

SECOND YEAR

(To be implemented from Academic Year- 2020-2021)

No.	Semester III		Credits	No.	Semester IV		Credits
Core Courses (CC)				***Core Courses (CC)***			
1	Actuarial Mathematics 1A [Theory] **2031UCHAM**	CC-5	4	1	Actuarial Mathematics 2A [Theory] **2041UCHAM**	CC-10	4
2	Actuarial Mathematics 1B [Theory] **2032UCHAM**	CC-6	4	2	Actuarial Mathematics 2B [Theory] **2042UCHAM**	CC-11	4
3	Actuarial Mathematics 1C [Theory] **2033UCHAM**	CC-7	4	3	Actuarial Mathematics 2C [Theory] **2043UCHAM**	CC-12	4
4	Actuarial Mathematics 1 [Practical] **2034UCHAM**	CC – 8 (5, 6,7) related	4	4	Actuarial Mathematics 2 [Practical] **2044UCHAM**	CC- 13 (10,11,12 related)	4
5	Insurance Principles and Designing of Insurance Products [Theory and Practical] **2035UCHAIP**	CC- 9	4+2	5	Data Analytics [Theory and Practical] **2045UCHADA**	CC-14	4+2
	TOTAL		**22**		**TOTAL**		**22**

THIRD YEAR

(To be implemented from Academic Year- 2021-2022)

No.	Semester V		Credits	No.	Semester VI		Credits
Core Courses (CC)				***Core Courses (CC)***			
1	Actuarial Economics 1 **2151UCHAE**	CC-15	4	1	Actuarial Economics 2 **2161UCHAE**	CC-17	4
Generic Elective (GE 1)				***Generic Elective (GE 2)***			
2	Any <u>one</u> from GE Group C • Actuarial Business Management • Entreprenuership **2152UCHABM/EN**	GE-1	3	2	Any <u>one</u> from GE Group D • Insurance Laws • Digital Marketing **2162UCHAIL/DM**	GE-2	3
Core Courses (CC)				***Core Courses (CC)***			
3	Actuarial Project – 1 **2153UCHAP**	CC - 16	6	3	Actuarial Project – 2 **2163UCHAP**	CC-18	6
Discipline Specific Elective (DSE) Courses				***Discipline Specific Elective (DSE) Courses***			
4	Any <u>one</u> from DSE Group C **2154UCHA SL / LI / EB / FR**	DSE-3	3	4	Any one from DSE Group D **2164UCHA SI / NL / HI / FI**	DSE-5	3
5	Any <u>one</u> from DSE Group C	DSE-4	3	5	Any <u>one</u> from DSE Group D	DSE-6	3
	DSE Group C Subjects				DSE Group D Subjects		
	• Securities Laws • Life Insurance • Employee Benefits and Laws • Financial Reporting Standards **2155UCHA SL / LI / EB / FR**				• Social Insurance • Non-life Insurance • Health Insurance • Finance and Investment **2165UCHA SI / NL / HI / FI**		
Ability Enhancement Compulsory Courses (AECC)				***Ability Enhancement Compulsory Courses (AECC)***			
6	Actuarial Business Communication 1 **21956UCHABC**	AECC -3	3	6	Actuarial Business Communication 2 **2166UCHABC**	AECC -4	3
	TOTAL		**22**		**TOTAL**		**22**

7.1 DISTRIBUTION OF CREDITS

Year 1	44
Year 2	44
Year 3	44
Extra Credits during Year 2 or Year 3	8
TOTAL	140

7.2 Code Description

For Example, Foundation Course: **2011UCHAFC**

20	Start Year of Implementation
11	Semester & Sr. No.
U	Under Graduate
C	Commerce Stream
H	Honours
A	Actuarial Studies
FC	Course Name

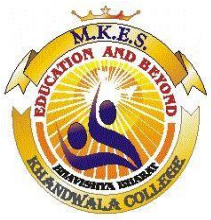
Bachelor of Commerce (Honours) Programme Actuarial Studies

Three Year Integrated Programme -

Six Semesters

Basic Structure: Distribution of Courses

1	**Ability Enhancement Compulsory Course (AECC)**	4 Courses of 3 Credit Hrs. each (Total Credit Hrs. 4*3)	12
2	**Skill Enhancement Compulsory Course (SEC)**	2 Courses of 4 Credit Hrs. each (Total Credit Hrs. 2*4)	8
3	**Core Course** **-Practical** **-Theory**	8 Courses of 6 Credit Hrs. each (Total Credit Hrs.8*6) and 10 Courses of 4 Credit Hrs. each (Total Credit Hrs. 10*4)	88
4	**Discipline Specific Elective (DSE)**	6 Courses of 3 Credit Hrs. each (Total Credit Hrs. 6*3)	18
5	**Genetic Elective (GE)**	2 Courses of 3 Credit Hrs. each (Total Credit Hrs. 2*3)	6
	Total Credits Hrs		132



Nagindas Khandwala College (Autonomous)

B. Com. (Honours) Actuarial Studies

Syllabus and Question Paper Pattern

of Courses of Bachelor of Commerce (Honours) Programme

Actuarial Studies

Third Year

Semester V and VI

Under Choice Based Credit, Grading and Semester System

(To be implemented from Academic Year- 2021-2022)

THIRD YEAR

No.	Semester V		Credits	No.	Semester VI		Credits
Core Courses (CC)				***Core Courses (CC)***			
1	Actuarial Economics 1 **2151UCHAE**	CC-15	4	1	Actuarial Economics 2 **2161UCHAE**	CC-17	4
Generic Elective (GE 1)				***Generic Elective (GE 2)***			
2	Any <u>one</u> from GE Group C • Actuarial Business Management • Entreprenuership **2152UCHABM/EN**	GE-1	3	2	Any <u>one</u> from GE Group D • Insurance Laws • Digital Marketing **2162UCHAIL/DM**	GE-2	3
Core Courses (CC)				***Core Courses (CC)***			
3	Actuarial Project – 1 **2153UCHAP**	CC - 16	6	3	Actuarial Project – 2 **2163UCHAP**	CC-18	6
Discipline Specific Elective (DSE) Courses				***Discipline Specific Elective (DSE) Courses***			
4	Any <u>one</u> from DSE Group C **2154UCHA SL / LI / EB / FR**	DSE-3	3	4	Any one from DSE Group D **2164UCHA SI / NL / HI / FI**	DSE-5	3
5	Any <u>one</u> from DSE Group C	DSE-4	3	5	Any <u>one</u> from DSE Group D	DSE-6	3
	DSE Group C Subjects				DSE Group D Subjects		
	• Securities Laws • Life Insurance • Employee Benefits and Laws • Financial Reporting Standards **2155UCHA SL / LI / EB / FR**				• Social Insurance • Non-life Insurance • Health Insurance • Finance and Investment **2165UCHA SI / NL / HI / FI**		
Ability Enhancement Compulsory Courses (AECC)				***Ability Enhancement Compulsory Courses (AECC)***			
6	Actuarial Business Communication 1 **21956UCHABC**	AECC -3	3	6	Actuarial Business Communication 2 **2166UCHABC**	AECC -4	3
	TOTAL		**22**		**TOTAL**		**22**

Nagindas Khandwala College (Autonomous)

B. Com. (Honours) Actuarial Studies

Syllabus and Question Paper Pattern Of

Third Year Semester V

1. Actuarial Economics 1

Under Academic Autonomy and Credit, Grading and Semester System

With effect from Academic Year 2021-22

Syllabus: Actuarial Economics 1

Objective: The aim of this subject is to introduce students to the core economic principles and how they can be used in a business environment to help decision making and behavior. It provides the fundamental concepts of microeconomics that explain how economic agents make decisions and how these decisions interact.

Outcome: On successful completion of this course, student should be able to

- show a systematic knowledge and critical awareness of economic theory in the areas of syllabus covered by the subject (Knowledge)
- apply a range of techniques to solve problems in the areas of syllabus covered by the subject (Apply)
- appreciate recent developments and methodologies in economics (Knowledge)
- understand the relevance of economic theory to the business environment and the links between economic theory and its application in business (Understand)
- apply basic microeconomic theory to business problems (Apply)

Syllabus: Actuarial Economics 1

Modules at a Glance

Sr. No.	Topics	No. of lectures
Module 1	Economic models, Some Recent historical applications and Behavior of Markets	15
Module 2	Consumers' Behavior and Economic Mechanism of A Manufacturing Firm	15
Module 3	A Firm's Behavior under Perfect Competition or Monopoly	15
Module 4	A Firm's Behavior under Imperfect Competition and Various Pricing Strategies	15
	Total	60

Detailed Syllabus

Module	Modules / Units

1	**Economic models, Some Recent historical applications and Behaviour of Markets**
	• Relevance of economics to the world of business
	  ○ opportunity cost, scarcity and their relevance to economic choice
	  ○ core economic concepts involved in choices made by businesses relevant to selection of outputs, inputs, technology, location and competition
	• microeconomics and macroeconomics
	• main strands of economic thinking:
	  ○ Classical
	  ○ Marxian socialism
	  ○ Neo-classical, Keynesian, neo-Keynesian and post-Keynesian
	  ○ Monetarist
	  ○ Austrian
	• The workings of competitive markets
	  ○ the markets' operations
	  ○ role of the price mechanism in a free market
	  ○ behavior of firms and consumers in such markets
	  ○ which influence the market demand and supply
	  ○ determination of market equilibrium quantity and price are achieved
	• Markets' reaction to changes in demand and supply
	  ○ Definition and Calculation of price and income elasticities of demand and price elasticity of supply
	  ○ Calculation of elasticity of demand using both original and average quantities
	  ○ Factors that affect elasticity
	  ○ Effect of elasticity on the workings of markets in the short and long run
	  ○ Firms' dealing with
	  ➢ risk and uncertainty about future market movements
	  price expectations and speculation and development of price bubbles

2	**Consumers' Behaviour and Economic Mechanism of A Manufacturing Firm** • Consumer demand and consumer behaviour o concept of utility and representation of consumer preferences as indifference curves o rational choice and determination of optimal consumption choice by using indifference curves and budget lines o concepts of rational choice, perfect information and irrational behavior in behavioral economics • Importance of advertising for a firm o effects of advertising on sales and demand • Understanding a firm's price and output decisions o Understanding how the production function reflects the relationship between inputs and outputs in the short and long run o Definition of average and marginal physical product o Meaning and measurement of costs and behavior of cost with variation in output in the short and long run o Definition of total, average and marginal costs o Meaning of "economies of scale" and understanding of how a business can achieve efficiency in selecting the level of its inputs o Understanding of Revenue and profit and how both are influenced by market conditions o Definition and calculation of average and marginal revenue o Measurement of profit determination of profit maximising output o Meaning of "shut-down" point in the short and long run
3	**A Firm's Behaviour under Perfect Competition or Monopoly** o Factors determining the market power of a firm o Main features of a market characterised by perfect competition o Determination of output and price in such markets in the short and long run o Emergence of monopolies o Selection of profit by a monopolist o Maximising price and output by monopolist o Barriers to entry in an industry and a contestable market and their effect on a monopolist's profit
4	**A Firm's Behaviour under Imperfect Competition and Various Pricing Strategies** • Profit maximisation under imperfect competition o Behaviour of firms under monopolistic competition and understanding of why in this type of market only normal profits are made in the long run • Main features of an oligopoly and explain how firms behave in an oligopoly o Factors determining competition and collusion of firms in an oligopoly o Game theory explaining the strategic decisions of such firms o Actions by Firms vis-à-vis consumers' interest in an oligopoly

	• Assessment of various pricing strategies that firms can adopt in imperfect competition ○ Understanding of how prices are determined in practice and factors that affect the ability of a firm to determine its prices ○ Average cost pricing and price discrimination ○ Pricing strategy for multiple products and understanding of how pricing varies with the stage in the life of a product

Reference Books:

Sr. No.	Title Author	Edition Year	ISBN Publisher
1.	ActEd Study Material Subject CT7	2016	Actuarial Education Company acted@bpp.com
2.	Economics for Business by J Sloman, K Hinde, D Garratt	6th	9780273792468 Pearson
3.	Economics. Begg, D. K. H.; Fischer, S.; Dornbusch, R	8th 2005	0077107756 McGraw Hill

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Nagindas Khandwala College (Autonomous)

B. Com. (Honours) Actuarial Studies

Syllabus and Question Paper Pattern Of

Third Year Semester V

2. Actuarial Business Management

Under Academic Autonomy and Credit, Grading and Semester System

With effect from Academic Year 2021-22

Syllabus: Actuarial Business Management

Objective: To provide students with an understanding of the wider business context in which Actuaries will work, integrating where appropriate the analysis of case studies to enhance the learning. The skills acquired should enable students to apply tools and techniques to assist strategic thinking and prepare for a role in wider management.

Outcome: On successful completion of this subject, a student will be able to:

- analyse the key drivers of external and internal business environments (Analyse)
- apply the strategic tools and frameworks needed to assess the competitiveness of a business (Apply)
- develop a coherent business strategy (Create)
- define a business's culture (Understand)
- explain how a business's culture will impact on the implementation of a chosen strategy (Knowledge)
- understand the role of values and behaviors in the long term success of a business (Understand)
- understand how to manage change within an organization (Understand)
- understand the importance of leadership in an organization (Understand)
- understand the nature and dynamics of working in teams (Understand)

Syllabus: **Actuarial Business Management**

Modules at a Glance

Sr. No.	Modules	No. of lectures
Module 1	The external business environment	15
Module 2	Organisational behavior: the internal business environment	15
Module 3	Strategic Management	15
Module 4	Managing Change, Leadership and Working in Teams	15
	Total	**60**

Sr. No.	Modules / Units
1	**The external business environment** ○ Nature of competitive environments ○ Different types of competitive environment. ○ Impact and influence of the external environment on an organisation and its strategy ○ Key drivers of external demands for corporate social responsibility and the way in which organisations can respond ○ Meaning and nature of organisational development ○ Nature, types and main features of organisational culture ○ Influences of organisational culture on the development and importance
2	**Organisational behaviour: the internal business environment** • Nature and main features of organizational behaviour in the context in which different businesses operate ○ Changing nature of work and work organisation ○ Main features of different approaches to organisation and management ○ Importance of management as an integrating activity ○ Impact of globalisation, the international context and cultural influences ○ Impact and influence of the internal environment on the implementation of an organisation's strategy.
3	• **Strategic Management** ○ Concepts in strategic management and objective of strategic management ○ Nature of, and functions served by, corporate strategy ○ Relationships between different levels of strategy in organisations ○ Importance of organisational goals, objectives and policy ○ Main features of the management of opportunities and risks

	○ Importance of strategy and structure for the effective management of organisations ○ Compare and contrast strategic analysis tools (audit and analysis of resources for use in strategic decision making) ○ Organisation's value chain (value chain analysis) ○ Impact and influence of the internal and external environment on an organisation and its strategy (PESTELE analysis; SWOT analysis; stakeholder mapping; quantitative and qualitative tools of competitor analysis; sources, quality and availability of data for environmental analysis; Porter's Five forces model; Porter's Diamond) ○ Use of scorecards (balanced and strategic) in the strategic management of a company ○ Recommend changes to the product portfolio to support the organisation's strategic goals (management of the product portfolio) ○ that payments are more frequent than annual but less frequent than continuous. • Understanding of the relations between ○ annuities payable in advance and in arrear ○ temporary, deferred and whole life annuities • Understanding of and the use of the relations between ○ assurance and annuity factors using equation of value (including their select and continuous equivalents) • Development of the expressions (in the form of sums/integrals) for the means and variances of the present value of the benefit payments under various assurance and annuity contracts, assuming constant deterministic interest rate

4	• **Managing Change, Leadership and Working in Teams** Managing change ○ Explain the nature of organisational change and the reasons for resistance to change ○ (including external and internal change triggers) ○ Describe the management of change and the human and social factors of change, objective of managing change ○ Compare and contrast tools and methods for successfully implementing a change programme ○ Understand the risks associated with managing change • Leadership\ ○ Importance of leadership in work organisations ○ Main approaches to leadership, different styles and forms of leadership ○ Importance of values and behaviours in the context of leadership ○ Exercise of leadership power and influence ○ Describe the variables which determine effective leadership. • Working in teams (to ensure strategic and operational goals are achieved efficiently and effectively) ○ Interactions among members of a group, a membership of successful teams ○ Main types of member team roles ○ Understand the professional and personal qualities ○ Nature and value of group dynamics ○ Tools and techniques of project management ○ Nature and causes of conflict ○ Approaches to the management of conflict ○ Importance of building effective teams and skills

Reference Books:

Sr. No.	Title Author	Edition Year	ISBN Publisher
1.	Strategic Management : Concepts and Cases By Fred David	11th 2006	8120331464 Prentice Hall of India
2.	Strategic Management : Competitiveness and Globalization, Concepts and Cases Hitt, Ireland, Hoskisson	2006	0324275285 South-West College Pub
3.	HBR's 10 Must Reads on Change Management		Harvard Business Review Press
4.	HBR's 10 Must Reads on Leadership		Harvard Business Review Press

Nagindas Khandwala College (Autonomous)

B. Com. (Honours) Actuarial Studies

Syllabus and Question Paper Pattern Of

Third Year Semester V

2. Entrepreneurship

Under Academic Autonomy and Credit, Grading and Semester System

With effect from Academic Year 2021-22

Syllabus: Entrepreneurship

Objective:
To provide students with knowledge on
- entrepreneurial potential as an individual
- discovering opportunities
- business models
- opportunities / ideas screening
- basic entrepreneurial issues

To develop critical thinking skills to solve real life Entrepreneurship and SME problems
To develop critical thinking skills on developing a career as entrepreneurs

Outcome: On successful completion of this subject, a student will be able to:
- Define the concept of entrepreneur (Knowledge)
- Classify different types of entrepreneurs and entrepreneurial ventures (Knowledge)
- Identify the skills and characteristics of successful entrepreneurs (Analyse)
- Learn how to deal with uncertainty (Knowledge)
- List the different forms that entrepreneurial opportunity can take (Knowledge)
- Identify trends and market signals that will create opportunities (Analyse)
- Understand changing environmental trends (Understand)
- Understand strategies for marketing (Understand)
- Understand the need of finance in Business (Understand)
- Discuss the various sources of funds required for a firm (Understand)
- Understand the ways of raising funds in primary market (Understand)
- Understand the importance of secondary market for mobilization of (Understand)

Syllabus: Entrepreneurship

Modules at a Glance

Sr. No.	Modules	No. of lectures
Module 1	**Entrepreneurial Opportunity**	**15**
Module 2	**Entrepreneurial Planning**	**15**
Module 3	**Enterprise Marketing**	**15**
Module 4	**Enterprise Growth Strategies and Resource Mobilisation**	**15**
	Total	**60**

Sr. No.	Modules / Units
1	**Entrepreneurial Opportunity** • Sensing Entrepreneurial Opportunities • Environment Scanning • Problem Identification • Idea fields • Spotting Trends • Creativity and Innovation • Selecting the Right Opportunity
2	**Entrepreneurial Planning** • Forms of business organization - Sole proprietorship, Partnership, Company • Business Plan: Concept, Format. • Components: Organisational plan; Operational plan; Production plan; Financial plan; Marketing plan; Human Resource planning
3	**Enterprise Marketing** • Marketing and Sales Strategy • Branding, Logo, Tagline • Promotion Strategy • Negotiations - Importance and Methods • Customer Relationship Management • Vendor Management

4	**Enterprise Growth Strategies** • Franchising: Concept, types, advantages, limitations. • Mergers and Acquisition: Concept, reasons, types. • Reasons for failure of Mergers and Acquisitions. **Resource Mobilization** • Capital Market - Primary and Secondary • Stock Exchange - Concept, features, functions and importance • Securities and Exchange Board of India - History, establishment, powers • Angel Investor: Features • Venture Capital: Features, funding.

Reference Books:

Sr. No.	Title Author	Edition Year	ISBN Publisher
1.	Before You Start Up: How to Prepare to Make Your Startup Dream a Reality by Pankaj Goyal		
2.	Crushing It!: How Great Entrepreneurs Build their Business and Influence and How You Can, Too by Gary Vaynerchuk		
3.	Think and Grow Rich by Napoleon Hill		
4.	Entrepreneurship by Dr. MMP. Akhouri and S.P Mishra		

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B. Com. (Honours) Actuarial Studies

Syllabus and Question Paper Pattern Of

Third Year Semester V

3. Actuarial Project-1

Under Academic Autonomy and Credit, Grading and Semester System

With effect from Academic Year 2021-22

Syllabus: Actuarial Project-1

Objective: To provide students an understanding of how to work in an actuarial office and to give an opportunity to acquire hands on experience of working on an actuarial problem under the guidance of an actuary.

Outcome: After successful completion of this course, student will be able to explore solutions for the real problems, encountered in a real life job, in the complete project execution from start to finish, by applying basic actuarial concepts, principles and skills.

Activities:
The following model guideline may be useful:

- Selection of the Project and Project Guide
- Preparation of Project Execution Plan : Time and Resource Allocation
- Guidance by the Project Guide, for the self-study of relevant actuarial aspects and concepts by the student.
- Self-study of relevant actuarial topics and techniques by the student.
- Specification by the student of the Project goal/objective, practicality, data collection plan, choice of Actuarial model to analyse, software needed for the same.
- Guidance and approval by Project Guide for Project goal/objective, practicality, data collection plan, choice of Actuarial model to analyse, software needed for the same.
- Decide on the size of the data to be collected vis-à-vis accuracy desired and ensure that it is practically feasible.
- Let the student execute the data collection now as per the plan. Examine the quality and quantity of data collected. Address to the problems encountered in the data collection, if any.
- After satisfactory completion of data collection, let student work on modeling and come up with a well-defined actuarial model statement.
- Approval of the model by the guide.
- Analysis of the model by the student with the intermittent help from the guide.
- Run the analysis with the data and achieve the desired kind of result.
- Examine if there are surprises or the possibility of an error in the process.
- If no errors are envisaged, prepare the report.
- Preparation of Project Report draft listing details of all the steps carried out.
- Discussion of the Project Report draft with the Project Guide. Address all the issues of ambiguity. Suggestions for improvement/completeness.
- Come up with the final project Report and the final submission of the same.

Project Report Format:

a. The project report should be printed on only right side of A4 size (210 mm x 297 mm) paper. There is no minimum or maximum page number limit for the "Project Report", but report of minimum 15–20 page is expected. The report may be bound suitably.

b. Margins should be as follows :·
   - Left Margin : 40 mm
   - Right Margin : 20 mm
   - Top Margin : 20 mm
   - Bottom Margin : 27 mm

c. Header should not be used. Footer, containing page number at the center should only be used, with footer margin of 25 mm.

d. Text should be printed in font size of 12 points and at interline distance of 18 points. (That is 1.5 line spacing). Normally, figures should be embedded in the text, where their first reference occurs. But if necessary, figures may be grouped on separate pages. Figure should be numbered as 'Fig C.F', where 'C' is chapter number and 'F' is figure number. Figure number 'F' is reset back to 1 for each new chapter.

Suggested Scheme of Chapters in Project Report:

e. Chapter 1: Introduction: Background of the project, Need for the project, Brief idea of the project

f. Chapter 2: Data Requirement: List the data items the values of which would be needed. Ascertain the number of on observations to be collected based on the desired accuracy of the results. Plan from where (the source) and how (the method) the data are to be collected with the budgeted time frame for data collection.

g. Chapter 3: Model Design: Specify the Model statement involving component parameters, their characteristics and interrelationships.

h. Chapter 4: Model Analysis: State the assumptions needed to analyse. The analysis may involve estimation of some parameters and testing of some hypothesis.

i. Chapter 5: Results and Conclusions: Analyze the observations and arrive at the results of the project. Discuss why the specifications were not met or the reasons for the failure, if any. Discussed the problems and difficulties encountered and how they were / can be eliminated. Discuss any extension work or modifications, which you want to suggest.

j. Chapter 6: References: List the books, magazines and data manuals used.

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Syllabus and Question Paper Pattern Of

Third Year Semester V

Under Academic Autonomy and Credit, Grading and Semester System

With effect from Academic Year 2021-22

[4]	**Any one subject from DSE Group C**	**[4 Credits]**
[5]	**One more subject from DSE Group C**	**[4 Credits]**

Nagindas Khandwala College (Autonomous)

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Syllabus and Question Paper Pattern Of

Third Year Semester V

DSE Group C

(C1) Security Laws

Under Academic Autonomy and Credit, Grading and Semester System

With effect from Academic Year 2021-22

Syllabus: Security Laws

Objective: The aim of this subject is to create an awareness amongst students of a variety of laws mainly pertaining to securities of all kinds (including securities pertaining to different kinds of assets, investments and capital market).

Outcome: On successful completion of this course, student should be able to

- describe, explain, interpret and discuss the implications and significance of various laws pertaining to (Understand, Analyse, Apply)
    - consumer protection laws
    - anti-corruption laws
    - financial security
    - investment security
    - organisation/professional bodies
    - cyber security
    - other significant items
- describe role of relevant regulators such as Securities and Exchange Board of India (Knowledge)

Syllabus: Security Laws

Modules at a Glance

Sr. No.	Modules	No. of lectures
Module 1	**Finance related Laws-I**	15
Module 2	**Finance related Laws-II**	15
Module 3	**Consumer Protection Laws and Anti-Corruption Laws**	15
Module 4	**Organisations' Laws and Other Laws**	15
	Total	**60**

Detailed Syllabus:

Sr. No.	Modules / Units
1	• **Finance related Laws-I** • Aadhaar (Targeted Delivery of Financial and other Subsidies, benefits and services) Act, 2016 • Banking Regulation Act, 1949 • Conservation of Foreign Exchange and Prevention of Smuggling Activities Act • Depositories Act • Expenditure Tax Act, 1987 • Finance Act (India) • Fiscal Responsibility and Budget Management Act, 2003 • Foreign Contribution (Regulation) Act, 2010 • Foreign Exchange Management Act • Fugitive Economic Offenders Act • Geographical Indications of Goods (Registration and Protection) Act, 1999

2	**Finance related Laws-II** • Foreign Exchange Regulation Act • Gift Tax Act, 1958 • Interest Tax Act, 1974 • The Gold (Control) Act, 1968 • Government Securities Act, 2006 • Indian Contract Act, 1872 • Insolvency and Bankruptcy Code, 2016 • Insurance Act, 1938 • Negotiable Instruments Act, 1881 • Securities and Exchange Board of India Act, 1992 • Securities Laws (Amendment) Act, 2014 • Securitisation and Reconstruction of Financial Assets and Enforcement of Security Interest Act, 2002 • The Competition Act, 2002 • The High Denomination Bank Notes (Demonetisation) Act, 1978 • The Income-tax Act, 1961 • Transfer of Property Act 1882 • Urban Land (Ceiling and Regulation) Act, 1976 • Wealth Tax Act, 1957

3	**Consumer Protection Laws and Anti-Corruption Laws**
	• Consumer Protection Laws
	  ○ Real Estate (Regulation and Development) Act, 2016
	  ○ Consumer Protection Act, 1986
	  ○ Essential Commodities Act
	  ○ Essential Services Maintenance Act
	• Anti-corruption Laws
	  ○ Benami Transactions (Prohibition) Act, 1988
	  ○ Black Money (Undisclosed Foreign Income and Assets) and Imposition of Tax Act, 2015
	  ○ Prevention of Corruption Act, 1988
	  ○ The Lokpal and Lokayuktas Act, 2013
	  ○ Mines and Minerals (Development and Regulation) Act
	  ○ Prevention of Money Laundering Act, 2002
	  ○ Whistle Blowers Protection Act, 2011

4	• **Organisations' Laws and Other Laws** • Chartered Accountants Act, 1949 • Companies Act 2013 • Indian Trusts Act, 1882 • Micro, Small and Medium Enterprises Development Act, 2006 • Reserve Bank of India Act, 1934 • The Indian Partnership Act, 1932 • Societies Registration Act, 1860 • The Limited Liability Partnership Act, 2008 • The Actuaries Act, 2006 • National Food Security Act, 2013 • Unlawful Activities (Prevention) Act • Information Technology Act, 2000 • Right to Information Act, 2005 • The Foreigners Act, 1946 • Maintenance of Internal Security Act • Prevention of Terrorism Act, 2002 • Terrorist and Disruptive Activities (Prevention) Act

Reference Books:

Sr. No.	Title Author	Edition Year	ISBN Publisher
1.	Capital Market & Securities Laws by Siddhartha Sankar Saha	2nd Ed. 2016	Taxmann
2.	Data Protection Law in India by Pavan Duggal	2016	Universal Law Publishing
3.	Ten Laws for Security By Eric Diehl	2016	Springer
4.	SEBI ACT by Agrawal and Baby		Taxmann

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Syllabus and Question Paper Pattern Of

Third Year Semester V

DSE Group C

(C2) Life Insurance

Under Academic Autonomy and Credit, Grading and Semester System

With effect from Academic Year 2021-22

Syllabus: Life Insurance

Objective: The aim of this subject is to use the technical and business skills learnt in the Actuarial Statistics, Actuarial Modeling and Business subjects to understand the real life working in a life insurance company to solve their problems.

Outcome: On successful completion of this subject, a student will be able to:

- understand strategic concepts in the management of life insurance company and their products (Knowledge)
- understand the risks faced both by individuals and groups who subscribe to their products and also the risks faced by life insurance companies (Knowledge)
- explain the principles and techniques used to manage these risks (Knowledge)
- understand the key techniques used by the life insurers to ensure that promised liabilities can be met (Knowledge)

Syllabus: Life Insurance

Modules at a Glance

Sr. No.	Modules	No. of lectures
Module 1	**Stakeholders in Life Insurance and the Business Environment**	15
Module 2	**Statement of the Problem and Its Solution**	15
Module 3	**Monitoring**	15
Module 4	**Risk in Life Insurance**	15
	Total	60

Detailed Syllabus:

Sr. No.	Modules / Units

1	**Stakeholders in Life Insurance and the Business Environment**
	• Stakeholders and meeting their needs
	• Actuarial advice
	• Actuarial Control Cycle
	• The general business environment
	  ○ Regulatory environment
	  ○ External environment
	  ○ Investment environment

2	**Statement of the Problem and Its Solution**
	• Product designing problem
	  ○ Contract Design
	  ○ Data
	• Producing the Solution to the Problem
	  ○ Modeling
	  ○ Assumption setting
	  ○ Investment return analysis and assumption
	  ○ Mortality estimation and assumption
	  ○ Cost estimation and expenses to be Charged
	  ○ Withdrawal analysis and assumption
	  ○ Investment Management
	  ○ Reserving
	  ○ Relationship between assets and liabilities

3	• **Monitoring**
	• Living with the solution
	  ○ Maintaining profitability
	  ○ Determining actual experience and reporting (for enterprise risk management perspective)
	  ○ Reviewing the assumptions based on actual experience
	  ○ Insolvency and closure
	  ○ Options and Guarantees

4	• **Risk in Life Insurance** ○ Risk governance ○ Risk Identification and Classification ○ Risk measurement and monitoring ○ Responses to Risk ○ Reinsurance ○ Capital management and monitoring ○ Innovation

Reference Books:

Sr. No.	Title Author	Edition Year	ISBN Publisher
1.	ActEd Study Material Subject SP2	2019	Actuarial Education Company acted@bpp.com
2.	ActEd Study Material Subject CP1	2019	Actuarial Education Company acted@bpp.com

Nagindas Khandwala College (Autonomous)

B. Com. (Honours) Actuarial Studies

Syllabus and Question Paper Pattern Of

Third Year Semester V

DSE Group C

(C3) Employee Benefits and Laws

Under Academic Autonomy and Credit, Grading and Semester System

With effect from Academic Year 2021-22

Syllabus: Employee Benefits and Laws

Objective: The aim of this subject is to appraise a student of various employee benefits in India, pertinent laws and to develop skills to apply

• the mathematical and economic techniques, and

• the principles of actuarial planning and control needed for the financial management of pensions and other employee benefits

Outcome: On successful completion of this subject, a student will be able to:

- describe features of employee benefits in India (Knowledge)
- state the laws pertaining to employee benefits in India and explain their significance (Knowledge)
- understand the main principles and techniques of actuarial management and control that are relevant to benefit provision (Knowledge)
- apply these principles to simple situations within the context of pensions and other benefits (Apply)
- analyse hypothetical scenarios, including using judgement to assess the implications of possible actions and to develop appropriate proposals or recommendations relating to the management of benefit arrangements (Analyse)

Syllabus: Employee Benefits and Laws

Modules at a Glance

Sr. No.	Modules	No. of lectures
Module 1	Employee Benefits in India and Laws	15
Module 2	Pension Provision and General Business Environment, Scheme Design	15
Module 3	Scheme Financing and Risk Management	15
Module 4	Model, Valuation, Setting Assumptions and Monitoring Assumptions	15
	Total	60

Detailed Syllabus

Sr. No.	Modules / Units
1	**Employee Benefits in India and Laws Risk** • Types of Employee Benefits : Defined Benefits, Defined Contribution • Employee Benefits in India: Employee Provident Fund, Private Provident Funds, Superannuation Plans, Pension plans, Gratuity, Company funded Healthcare Plans, Other Plans (including Paid time off/leave encashment programme) o For company funded plans, where benefits are subject to uncertainty/variation based on salary or payment time or other factors, understand and apply the applicable laws (including Payment of Gratuity Act, 1972; Maternity Benefit Act) or guidelines for valuation • Post Employment Benefit and Other Employment Benefit under AS 15 (R) and IndAS 19
2	**Pension Provision and General Business Environment, Scheme Design** • Describe the roles that interested parties may play, and responsibilities they may have, in the provision of benefits, including: o the State and statutory bodies o employers or groups of employers o trustees or scheme managers o Financial advisers o individuals or groups of individuals • Compare the provision of benefits from the State, employers in the public and private sector and individuals • Discuss the implications, for the parties stated above, of the environment in which benefits are provided, including: o different presentation and reporting of benefits and contributions o regulation and taxation o any professional guidance for actuaries or other professionals • Discuss the issues surrounding sponsor covenant in terms of: o measurement o integration with funding and investment • Discuss the factors to consider in determining a suitable design for a pension scheme, or other benefits such as social security benefits, including: o type of pension scheme e.g. defined benefit, defined contribution, risk-sharing o the governance requirements o the level and form of benefits and/or contributions o the method of financing the benefits o how risk is shared between parties o the choice of assets (when benefits are to be funded)

3	**Scheme Financing and Risk Management**
	• Describe the different ways in which providers may be able to finance the benefits to be provided, including:
	  ○ the timing of contributions (relative to when the benefits are due to be paid)
	  ○ the forms and characteristics of investment that may be available (if benefits are funded)
	  ○ financial instruments, including contingent assets, which may be used to back benefit promises
	• Identify the risks affecting scheme constituents
	• Discuss the issues taken into account in producing information to meet accounting standards
	• Discuss the main factors that should be taken into account in setting appropriate terms and consent requirements for member options, taking into account the risk and reward for all relevant parties
	• Discuss the factors taken into account in setting the investment strategy of a provider of benefits. Describe how projection models may be used to develop appropriate strategies
	• Discuss the principles underlying the use of insurance as a means of risk mitigation

4	**Model, Valuation, Setting Assumptions and Monitoring Assumptions** • Discuss the use of actuarial models for decision making purposes • Discuss the principles underlying the determination of the funding method, valuation method and assumptions for valuing benefits and contributions • Discuss how to determine values for assets, past and future benefits and future contribution requirements • Discuss the principles underlying the determination of discontinuance terms for benefits • Identify the sources of surplus/deficit for a benefit provider and discuss the factors that affect the application of this surplus/deficit • Analyse hypothetical examples and scenarios in relation to the financial management of pension arrangement

Reference Books:

Sr. No.	Title Author	Edition Year	ISBN Publisher
1.	ActEd Study Material Subject SP4	2019	Actuarial Education Company acted@bpp.com

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B. Com. (Honours) Actuarial Studies

Syllabus and Question Paper Pattern Of

Third Year Semester V

DSE Group C

(C4) Financial Reporting Standards

Under Academic Autonomy and Credit, Grading and Semester System

With effect from Academic Year 2021-22

Syllabus: Financial Reporting Standards

Objective: The aim of this course is to provide an insight into the need and implications of various financial reporting standards (including their effect on actuarial valuation of liabilities).

Outcome: On successful completion of this course, a student shall be able to

- describe and explain its significance and implication of various financial accounting standards (including their effect on actuarial valuation of liabilities) (Knowledge, Apply, Analyse)

Syllabus: Financial Reporting Standards

Modules at a Glance

Sr. No.	Modules	No. of lectures
Module 1	**National and Global Financial Reporting Standards**	15
Module 2	**Major Indian Accounting Standards and Their Implications**	15
Module 3	**Share Based Payments**	15
Module 4	**Post Employment Benefit and Other Employment Benefit Disclosures**	15
	Total	60

Sr. No.	Modules / Units
1	**National and Global Financial Reporting Standards** • Need of having Financial Reporting Standards • History and Evolution • significance and Importance of standards • IFRS • GAAP • Ind AS (including a list of all standards)

2	**Major Indian Accounting Standards and Their Implications** Detailed discussion on following standards and their implications**:** • Ind AS 101 • Ind As 103 • Ind AS 104 • Ind AS 107 • Ind AS 109 • Ind AS 110 • Ind AS 113 • Ind AS 1 • Ind AS 2 • Ind AS 7 • Ind AS 8 • Ind AS 12 • Ind AS 16 • Ind AS 17 • Ind AS 18 • Ind AS 19 • Ind AS 21 • Ind AS 23 • Ind AS 24 • Ind AS 27 • Ind AS 28 • Ind AS 29 • Ind AS 32 • Ind AS 33 • Ind AS 37 • Ind AS 38 • Ind AS 40
3	**Share Based Payments** Detailed discussion on following standard and its application and implications (with numerical illustrations): • IndAS 102
4	**(i) Post Employment Benefit and Other Employment Benefit Disclosures** Detailed discussion on following standards and its application and implications: • IndAS 15 (R) • IndAS 19 (ii) Implementation of IFRS17 by insurance companies and its implications

Reference Books:

Sr. No.	Title Author	Edition Year	ISBN Publisher
1.	International Financial Reporting Standards		8130903822 Viva
2.	A Quick Guide to Indian Accounting Standards (Ind AS) as amended by Companies Rules 2017 By Chintan Patel and Bhupendra Mantri	2017	Taxmann
3.	Post Employment Benefit and Other Long term Benefit Disclosures under Ind AS 19 and AS 15 (R) by Mayur Ankolekar	2017	Mayur Ankolekar
4.	The Rise of New DC by Mayur Ankolekar	Aug 2017	Actuary India
5.			

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Syllabus and Question Paper Pattern Of

Third Year Semester V

6. Actuarial Business Communication 1

Under Academic Autonomy and Credit, Grading and Semester System

With effect from Academic Year 2021-22

Syllabus Actuarial Business Communication 1

Objective: The aim of this course is

- to identify appropriate forms of written communication
- to select appropriate language for a non-technical audience
- to identify the key issues that need to be addressed and convey these in an effective way

Outcome: On completion of this course, a successful candidate will be able to:

- draft an appropriate piece of communication as directed, to a standard expected of a newly qualified actuary without the need for significant re-drafting (create)
- use an effective structure (Apply)
- identify and use appropriate language that the intended recipient(s) will understand easily (Apply)
- provide adequate and appropriate explanation of technical concepts (Understand)
- incorporate appropriate communications tools to help convey meaning (e.g. graphs, tables and charts) (Understand)
- reflect appropriately on their approach to a particular piece of communication (Analyse)

Syllabus Actuarial Business Communication 1

Modules at a Glance

Sr. No.	Modules	No. of lectures
Module 1	**Identify relevant information and appropriate content**	15
Module 2	**Use an effective structure and Adopt Appropriate Language**	10
Module 3	**Include appropriate explanation**	10
Module 4	**Incorporate effective communication tools**	10
	Total	45

Detailed Syllabus

Sr. No.	Modules / Units
1	• **Identify relevant information and appropriate content** • Identify key information that must be conveyed in order for a communication to meet the objectives. This may include: o setting out any implications that may affect the intended recipients' decisions o disclosing the extent of any uncertainty involved, and any limitations in the information being communicated, if that uncertainty or those limitations may affect the intended recipients' decisions • Assess what information is not necessary and might, if included, detract from communicating effectively. • Use numbers in a way that is appropriate for the intended recipient(s), given the objectives of the communication • Prepare numerical examples, where appropriate, by drawing on some or all of the available data, or, creating representative numeric examples (if suitable data is not provided) • Prepare numerical information so that it is presented in an appropriate format (e.g. appropriate use of percentages, ratios, fractions) and level of detail(e.g. well-judged number of significant figures or decimal places). • Be able to justify the choice of information and content
2	**Use an effective structure and Adopt Appropriate Language** • Understand use of an Effective Structure o Prepare an appropriate structure for a specific communication objective o Be able to justify the choice of structure • Adopt appropriate language o Assess what terminology will be easily understood by the intended recipient(s) o Explain or define necessary technical terms at an appropriate level of detail for the intended recipient(s). o Be able to justify the choice of language and terminology.

3	**Include appropriate explanation** • Set-out a draft communication for the intended recipient(s), including: ○ sufficient explanatory steps ○ effective explanation ○ appropriate level of detail ○ technically correct information that is not misleading
4	**Incorporate effective communication tools** • Set-out information using simple and effective communication tools: ○ visual presentation of numerical information ○ diagrams or pictures ○ bullet points • Be able to justify the choice of communication tool(s) for presenting numerical information (e.g. data tables, bar charts, line charts, pie charts, scatter charts etc.).

Reference Books:

Sr. No.	Title Author	Edition Year	ISBN Publisher
1.	ActEd Study Material CA3	2010	Actuarial Education Company acted@bpp.com
2.	Communication in Organisation by Dalmar, Fisher	2009	Jaico Publication
3.	Business Communication: Process and Product Mary, Allen, Guffey		South Western College Publication

Nagindas Khandwala College (Autonomous)

B. Com. (Honours) Actuarial Studies

Syllabus of Courses of Bachelor of Commerce (Honours) Programme

Actuarial Studies

Third Year Semester VI

Under Academic Autonomy, Choice Based Credit, Grading

and Semester System Course Structure

With effect from Academic Year 2021-22

Nagindas Khandwala College (Autonomous)

B. Com. (Honours) Actuarial Studies

Syllabus and Question Paper Pattern Of

Third Year Semester VI

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1. Actuarial Economics 2

Under Academic Autonomy and Credit, Grading and Semester System

With effect from Academic Year 2021-22

Syllabus: Actuarial Economics 2

Objective: The aim of this subject is to introduce students to

- the core economic principles and appraise them of how these can be used in a business environment to help decision making and behavior
- the principles underlying macroeconomics that explain how the economic system works, where it fails and how decisions taken by economic agents affect the economic system

Outcome: On successful completion of this course, student should be able to

- show a systematic knowledge and critical awareness of economic theory in the areas of syllabus covered by the subject (Knowledge)
- apply a range of techniques to solve problems in the areas of syllabus covered by the subject (Apply)
- appreciate recent developments and methodologies in economics (knowledge, analyse)
- understand the relevance of economic theory to the business environment and the links between economic theory and its application in business (Understand, Analyse)
- apply basic macroeconomic theory to business problems (Apply)

Syllabus: Actuarial Economics 2

Modules at a Glance

Sr. No.	Modules	No. of lectures
Module 1	**Recent Macroeconomic Applications and Relationship between Governments, Markets and Firms**	15
Module 2	**Globalisation, International Trades and Macroeconomic Environment of the Business**	15
Module 3	**Role of Balance of Payments, Money and Interest Rates and Stability of Financial System**	15
Module 4	**Unemployment, Inflation, Macroeconomic Policies, Supply side Policies**	15
	Total	**60**

Detailed Syllabus

Sr. No.	Modules / Units
1	**Recent Macroeconomic Applications and Relationship between Governments, Markets and Firms** • Analysis of the recent macroeconomic history o Progress of the world economy since the Great Depression ➢ a history of banking crises and irrational behaviour ➢ consequence of banking crises o Banking crisis of 2008, the Great Recession and recovery o Effectiveness of the monetary policy in the 2008 financial crisis and the governments' actions to combat recession o Aftershocks in Europe following the 2008 financial crisis o Assess the stimulus-austerity debate and regulatory action after the 2008 crisis • Government intervention in the market o How far do businesses meet the interests of consumers and society in general o Perfect markets and "socially efficient" markets o Why externalities can lead to inefficient markets o How governments intervene in markets in order to influence business behaviour and the drawbacks of such intervention o Can taxation or regulation be more useful in correcting markets' shortcomings • Relationship between the Government and the Individual Firm o Main targets of "competition policy" and its effectiveness o Why a free market fails to achieve the optimal amount of research and development ➢ Various forms of intervention that the government can undertake in order to encourage technological advance and innovation

2	**Globalisation, International Trades and Macroeconomic Environment of the Business**
	• Globalisation and multinational business
	  ○ Meaning of Globalisation and its impact on business
	  ○ Factors driving the process of globalisation and the benefits of globalisation of business to the world
	
	• Importance of international trade
	  ○ Growth of international trade and its benefits to countries and firms
	  ○ Advantages of specialisation
	  ○ Arguments for trade restriction and protection of domestic industries
	  ○ Role of the World Trade Organisation (WTO) in international trade
	
	• Macroeconomic environment of the business
	  ○ Main macroeconomic variables that governments seek to control
	  ○ Determinants of the level of economic activity and hence the overall business climate
	  ○ Effect of a stimulus to the economy on the business output
	  ○ Actual growth versus potential growth
	  ○ Factors determining economic growth and the reasons for differences in different nations' growth rates
	  ○ Relationship between economic growth and environmental sustainability
	  ○ Why economies experience periods of boom followed by periods of recession and explain factors which influence the length and magnitude of the phases of a business cycle
	  ○ Causes and costs of unemployment and relationship of unemployment with the level of business activity
	  ○ Determination of the price level in the economy by the interaction between aggregate supply and aggregate demand in a simple AS-AD model
	  ○ Causes and costs of inflation and relationship of unemployment with the level of business activity
	  ○ Meaning of GDP and how it is measured
	  ○ Representation of the economy as a simple model of the circular flow of income

	• Role, Structure and Stability of the Financial System ○ Different financial systems ○ Evaluate how effectively different financial systems operate, with reference to the UK and China ○ Role of the financial markets and how financial markets help to achieve a nation's objectives ○ Different participants in the financial markets ○ Development of financial systems and the factors affecting the stability of financial systems
4	**Unemployment, Inflation, Macroeconomic Policies, Supply side Policies** • Level of business activity, unemployment and inflation ○ How the equilibrium level of income is determined within a simple aggregate demand-expenditure model ○ Concept of the multiplier and calculate its value ○ Effect of a rise in money supply on output and prices ○ Relationship between unemployment and inflation its stability ○ How business and consumer expectations affect the relationship between unemployment and inflation and basis of such expectations ○ How a policy of targeting inflation affects the relationship between unemployment and inflation ○ Determinants of the course of a business cycle and its turning points ○ Impact of changes in aggregate demand and changes in aggregate supply for creation of business cycle • Impact of macroeconomic policies on businesses ○ Types of macroeconomic policy that are likely to impact on business and explain the way in which this impact takes effect ○ Impact of fiscal policy on the economy and business, and factors that determine its effectiveness in smoothing out economic fluctuations ○ Fiscal rules adopted by the government and its usefulness ○ Monetary policy in the UK and the Eurozone and the roles of the Bank of England and the European Central Bank ○ Monetary policy in India and the role of the Reserve Bank of India ○ Influence of targeting inflation on interest rates and hence the economic activity ○ Merits of following a simple inflation target as a rule for determining interest rates and suggestions for an alternative rule • Impact of Supply side policies on businesses ○ Effect of supply side policies on business and the economy ○ Types of supply side policies that can be pursued and their effectiveness ○ Impact of a policy of tax cuts on business ○ Major types of policy open to governments to encourage increased competition

Reference Books:

Sr. No.	Title Author	Edition Year	ISBN Publisher
1.	ActEd Study Material Subject CT7	2018	Actuarial Education Company acted@bpp.com
2.	Economics for Business by J Sloman, K Hinde, D Garratt	6th	9780273792468 Pearson
3.	Economics. Begg, D. K. H.; Fischer, S.; Dornbusch, R	8th 2005	0077107756 McGraw Hill

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B. Com. (Honours) Actuarial Studies

Syllabus and Question Paper Pattern Of

Third Year Semester VI

2. Insurance Laws

Under Academic Autonomy and Credit, Grading and Semester System

With effect from Academic Year 2021-22

Syllabus: Insurance Laws

Objective: The aim of this subject is to create an awareness amongst students of a variety of laws pertaining to insurance (including life insurance, non-life insurance and health insurance) business.

Outcome: On successful completion of this course, student shall be able to describe, understand, interpret and analyse the implications of various laws pertaining to insurance sector. This in turn, would equip them to make better decisions regarding product design, pricing and reserve needed. (Knowledge, Analyse, Apply)

Syllabus: Insurance Laws

Modules at a Glance

Sr. No.	Modules	No. of lectures
Module 1	**Background of Insurance Laws in India**	15
Module 2	**Principles of Insurance Laws**	15
Module 3	**Insurance Laws in India**	15
Module 4	**Actuaries and Regulatory Authorities**	15
	Total	**60**

Detailed Syllabus:

Sr. No.	Modules / Units
1	**Background of Insurance Laws in India** • Historical background of Insurance • Insurance scenario in India • Evolution of Insurance law in India
2	• **Principles of Insurance Laws** • Principles of Insurance law • List of legislations regulating the insurance sector in India and their roles • Micro insurance and relevant Laws
3	**Insurance Laws in India** • Overview of insurance laws in India • Concurrent Audit of Insurance companies • Corporate Governance Guidelines for insurance companies
4	**Actuaries and Regulatory Authorities** • Insurance intermediaries • Actuaries and their role in Insurance sector • Regulatory Authorities • Insurance Associations and Regulators across the world • Important websites

Reference Books:

Sr. No.	Title Author	Edition Year	ISBN Publisher
1.	Regulations of Insurance Business	2016	Insurance Institute of India
2.	Insurance Laws of India By Rajkumar Adukia [insurance-hb-1101.pdf]	2012	www.taxguru.in
3.	Insurance Law Regulations in India By Nitish Desai		Nitish Desai Associates

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Syllabus and Question Paper Pattern Of

Third Year Semester VI

2. Digital Marketing

Under Academic Autonomy and Credit, Grading and Semester System

With effect from Academic Year 2021-22

Syllabus: Digital Marketing

Objective: To provide students with an understanding of what is Digital Marketing, its strength, scope and its tools to embark on a career for a digital entrepreneur.

Outcome: On successful completion of this subject, a student will be able to:

- describe what is digital marketing, its scope and range of activities
- demonstrate cognitive knowledge of the skills required in conducting online research and research on online markets, as well as in identifying, assessing and selecting digital market opportunities.\
- explain emerging trends in digital marketing
- demonstrate the use of digital marketing tools
- investigate and evaluate issues in adapting to globalised markets that are constantly changing and increasingly networked
- demonstrate their skills to do marketing through various social media

Syllabus: Digital Marketing

Modules at a Glance

Sr. No.	Modules	No. of lectures
Module 1	**Digital Marketing: Introduction and Overview**	15
Module 2	**Social Media Marketing**	15
Module 3	**Other Marketing**	15
Module 4	**Digital Marketing Tools**	15
	Total	**60**

Detailed Syllabus:

Sr. No.	Modules / Units
1	**Digital Marketing: Introduction and Overview** • Introduction • Digital Marketing Vs. Traditional Marketing • Website Planning Process • CMS Systems • Advanced SEO
2	**Social Media Marketing** • Marketing through Various Social Media including Facebook, WhatsApp, LinkedIn, Twitter, Youtube, Instagram • Google Analytics, Adwords and online advertisement Placing
3	**Other Marketing** • Content Marketing • Ecommerce Marketing • Blog Marketing • Email Marketing • Mobile Marketing • ORM Marketing • Affiliate Marketing • AppStore Optimisation
4	**Digital Marketing Tools and Business** • Digital Marketing Tools • Periscope Marketing • Sales Funnel • Business Strategies • Make Money Online

Reference Books:

Sr. No.	Title Author	Edition Year	ISBN Publisher
1.	Jab, Jab, Jab, Right Hook: How to Tell Your Story in a Noisy Social World – Gary Vaynerchuk		Happr Collins Publisher
2.	Epic Content Marketing – Joe Pulizzi		McGrawHill
3.	Web Analytics 2.0 – Avinash Kaushik		
4.	The Art of SEO – Eric Enge, Stephan Spencer and JeccieC.Stricchiola	3rd Edition	

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Syllabus and Question Paper Pattern Of

Third Year Semester VI

3. Actuarial Project 2

Under Academic Autonomy and Credit, Grading and Semester System

With effect from Academic Year 2021-22

Syllabus: Actuarial Project 2

Objective: To provide students an understanding of how to work in an actuarial office and to give an opportunity to acquire hands on experience of working on an actuarial problem under the guidance of an actuary.

Outcome: After successful completion of this course, student will be able to explore solutions for the real problems, encountered in a real life job, in the complete project execution from start to finish, by applying basic actuarial concepts, principles and skills.

Activities:
The following model guideline may be useful:

- Selection of the Project and Project Guide
- Preparation of Project Execution Plan : Time and Resource Allocation
- Guidance by the Project Guide, for the self-study of relevant actuarial aspects and concepts by the student.
- Self-study of relevant actuarial topics and techniques by the student.
- Specification by the student of the Project goal/objective, practicality, data collection plan, choice of Actuarial model to analyse, software needed for the same.
- Guidance and approval by Project Guide for Project goal/objective, practicality, data collection plan, choice of Actuarial model to analyse, software needed for the same.
- Decide on the size of the data to be collected vis-à-vis accuracy desired and ensure that it is practically feasible.
- Let the student execute the data collection now as per the plan. Examine the quality and quantity of data collected. Address to the problems encountered in the data collection, if any.
- After satisfactory completion of data collection, let student work on modeling and come up with a well-defined actuarial model statement.
- Approval of the model by the guide.
- Analysis of the model by the student with the intermittent help from the guide.
- Run the analysis with the data and achieve the desired kind of result.
- Examine if there are surprises or the possibility of an error in the process.
- If no errors are envisaged, prepare the report.
- Preparation of Project Report draft listing details of all the steps carried out.
- Discussion of the Project Report draft with the Project Guide. Address all the issues of ambiguity. Suggestions for improvement/completeness.
- Come up with the final project Report and the final submission of the same.

Project Report Format:

a. The project report should be printed on only right side of A4 size (210 mm x 297 mm) paper. There is no minimum or maximum page number limit for the "Project Report", but report of minimum 15–20 page is expected. The report may be bound suitably.

b. Margins should be as follows :·
   - Left Margin : 40 mm
   - Right Margin : 20 mm
   - Top Margin : 20 mm
   - Bottom Margin : 27 mm

c. Header should not be used. Footer, containing page number at the center should only be used, with footer margin of 25 mm.

d. Text should be printed in font size of 12 points and at interline distance of 18 points. (That is 1.5 line spacing). Normally, figures should be embedded in the text, where their first reference occurs. But if necessary, figures may be grouped on separate pages. Figure should be numbered as 'Fig C.F', where 'C' is chapter number and 'F' is figure number. Figure number 'F' is reset back to 1 for each new chapter.

Suggested Scheme of Chapters in Project Report:

a. Chapter 1: Introduction: Background of the project, Need for the project, Brief idea of the project

b. Chapter 2: Data Requirement: List the data items the values of which would be needed. Ascertain the number of on observations to be collected based on the desired accuracy of the results. Plan from where (the source) and how (the method) the data are to be collected with the budgeted time frame for data collection.

c. Chapter 3: Model Design: Specify the Model statement involving component parameters, their characteristics and interrelationships.

d. Chapter 4: Model Analysis: State the assumptions needed to analyse. The analysis may involve estimation of some parameters and testing of some hypothesis.

e. Chapter 5: Results and Conclusions: Analyze the observations and arrive at the results of the project. Discuss why the specifications were not met or the reasons for the failure, if any. Discussed the problems and difficulties encountered and how they were / can be eliminated. Discuss any extension work or modifications, which you want to suggest.

f. Chapter 6: References: List the books, magazines and data manuals used.

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With effect from Academic Year 2021-22

[4] One subject from DSE Group D **[4 Credits]**

[5] One more subject from DSE Group D **[4 Credits]**

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Syllabus and Question Paper Pattern Of

Third Year Semester VI

DSE Group D

(D1) Social Insurance

Under Academic Autonomy and Credit, Grading and Semester System

With effect from Academic Year 2021-22

Syllabus: Social Insurance

Objective: To provide a student an insight into various social security / insurance schemes available in India which may enable them for creating awareness among community at large and in financial advisory role.

Outcome: On successful completion of this course, a student shall be able to describe the features, understand the usefulness and compare different social security/insurance schemes. (Knowledge, Analyse, Apply)

Syllabus: Social Insurance

Modules at a Glance

Sr. No.	Modules	No. of lectures
Module 1	**Social Insurance**	15
Module 2	**Partly/Fully Employer/Government Funded Schemes**	15
Module 3	**Voluntary Social Security Schemes**	15
Module 4	**Actuarial Modeling to Determine Funding Requirement of Social Insurance Scheme**	15
	Total	**60**

Detailed Syllabus

Sr. No.	Modules / Units
1	**Social Insurance** • Need • Meaning • Features • Social Insurance Vs. Commercial Insurance • Schemes in India
2	**Partly/Fully Employer/Government Funded Schemes** • Gratuity • Defined Benefit Pension Scheme by Government to its employees • Defined Benefit Pension Scheme by a non-government organisation to its employees • Atal Pension Yojana • Ayushman Bharta Yojana • Life Cover under Pradhan Mantri Jan Dhan Yojana • Pradhan Mantri Jeevan Jyoti Bima Yojana • Pradhan Mantri Suraksha Bima Yojana • Pradhan Mantri Vaya Vandana Yojana • Varishtha Pension BimaYojana • Pradhan Mantri Fasal Bima Yojana • Restructured Weather Based Crop Insurance Scheme Besides features, history and philosophy behind the schemes need to be known. Also, what are the Government's estimated costs of the benefits?
3	**Voluntary Social Security Schemes** • Sukanya Samriddhi Yojana • National Pension Scheme • Public Provident Fund (PPF) • National Savings Certificate (NSC) • Post Office Time Deposits and Bank FDs • Kisan Vikas Patra
4	**Actuarial Modeling to Determine Funding Requirement of Social Insurance Scheme** Select a scheme, make assumptions about the membership size and other relevant parameters and fit a suitable actuarial model to determine the funding requirement for the sponsoring entity. Such exercise can be performed for a variety of schemes.

Reference Books:

Sr. No.	Title Author	Edition Year	ISBN Publisher
1.	The Need for Social Insurance https://wallstreetpit.com/61935-the-need-for-social-insurance/	2011	https://wallstreetpit.com
2.	Social Insurance: Meaning and Features http://www.economicsdiscussion.net/social-insurance/social-insurance-meaning-and-features-poverty-economics/29305		http://www.economicsdiscussion.net
3.	Introduction to Social Security (with Special Reference to India)by Hitesh Bhatia	2015	Mangalam Publications
4.	The Employees' State Insurance Corporation (ESIC): Organisation and Functioning by R. Vasanthagopal and Mathew Jose. K		

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Syllabus and Question Paper Pattern Of

Third Year Semester VI

DSE Group D

(D2) Non-life Insurance

Under Academic Autonomy and Credit, Grading and Semester System

With effect from Academic Year 2021-22

Syllabus: Non-life Insurance

Objective: The aim of this subject is to use the technical and business skills learnt in the Actuarial Statistics, Actuarial Modeling and Business subjects to understand the real life working in a non-life insurance company to solve their problems.

Outcome: On successful completion of this subject, a student will be able to:

- understand strategic concepts in the management of non-life insurance company and their products (Knowledge)
- understand the risks faced both by individuals and groups who subscribe to their products and also the risks faced by non-life insurance companies (Knowledge, Analyse)
- explain the principles and techniques used to manage these risks (Knowledge)
- understand the key techniques used by the non- life insurers to ensure that promised liabilities can be met (Knowledge)

Syllabus: Non-life Insrance

Modules at a Glance

Sr. No.	Modules	No. of lectures
Module 1	**Stakeholders in Non-life Insurance and the Business Environment**	15
Module 2	**Statement of the Problem and Its Solution**	15
Module 3	**Monitoring**	15
Module 4	**Risk in Non-Life Insurance**	15
	Total	**60**

Detailed Syllabus

Sr. No.	Modules / Units

1	**Stakeholders in Non-life Insurance and the Business Environment**
	• Stakeholders and meeting their needs
	• Actuarial advice
	• Actuarial Control Cycle
	• The general business environment
	  ○ Regulatory environment
	  ○ External environment
	  ○ Investment environment

2	**Statement of the Problem and Its Solution**
	• Product designing problem
	  ○ Contract Design
	  ○ Data
	• Producing the Solution to the Problem
	  ○ Modeling
	  ○ Assumption setting
	  ○ Investment return analysis and assumption
	  ○ Experience analysis and assumption
	  ○ Cost estimation and premium loading required
	  ○ Experience rating and No Claim Discount system to be designed for certain products
	  ○ Cost analysis for Claim assessment and determination of deductible
	  ○ Investment Management
	  ○ Reserving
	  ○ Reinsurance
	  ○ Relationship between assets and liabilities

3	**Monitoring**
	• Living with the solution
	  ○ Maintaining profitability
	  ○ Determining actual experience and reporting (for enterprise risk management perspective)
	  ○ Reviewing the assumptions based on actual experience
	  ○ Insolvency and closure
	  ○ Options and Guarantees
	  ○ Initial Capital requirement
	  ○ Usefulness of reinsurance

4	**Risk in Non-Life Insurance** ○ Risk governance

	○ Risk Identification and Classification ○ Risk measurement and monitoring ○ Responses to Risk ○ Capital management and monitoring ○ Innovation

Reference Books:

Sr. No.	Title Author	Edition Year	ISBN Publisher
1.	ActEd Study Material Subject SP2	2019	Actuarial Education Company acted@bpp.com

Nagindas Khandwala College (Autonomous)

B. Com. (Honours) Actuarial Studies

Syllabus and Question Paper Pattern Of

Third Year Semester VI

DSE Group D

(D3) Health Insurance

Under Academic Autonomy and Credit, Grading and Semester System

With effect from Academic Year 2021-22

Syllabus: Health Insurance

Objective: The aim of this subject is to use the technical and business skills learnt in the Actuarial Statistics, Actuarial Modeling and Business subjects to understand the real life working in a health insurance company to solve their problems.

Outcome: On successful completion of this subject, a student will be able to:

- understand strategic concepts in the management of health insurance company and their products (Knowledge)
- understand the risks faced both by individuals and groups who subscribe to their products and also the risks faced by health insurance companies (Knowledge)
- explain the principles and techniques used to manage these risks (Knowledge)
- understand the key techniques used by the health insurers to ensure that promised liabilities can be met (Knowledge)

Syllabus: Health Insurance

Modules at a Glance

Sr. No.	Modules	No. of lectures
Module 1	Health and Care products and general business environment	15
Module 2	Product design and specific features	15
Module 3	Risks and risk management	15
Module 4	Models, Valuation, Monitoring Experience and Setting Assumption	15
	Total	**60**

Detailed Syllabus

Sr. No.	Modules / Units

1	**Health and Care products and general business environment**
	• Describe the main types of Health and Care contact and their purpose for the customer products:
	  ○ critical illness insurance
	  ○ income protection insurance
	  ○ long term care insurance
	  ○ health cash plans
	  ○ major medical expenses
	  ○ private medical insurance
	  ○ group and individual covers
	• Understand the operating environments in which health and care insurance products and services are traded.
	  ○ distribution channels
	  ○ regulatory and taxation regimes
	  ○ professional guidance
	  ○ economic and political influences
	• Explain the role of the State in the provision of alternative or complementary health and care protection
	  ○ objectives of State healthcare provision
	  ○ methods of State healthcare provision
	  ○ funding approaches

2	**Product design and specific features**
	• Demonstrate an understanding of health and care product design, including:
	  ○ Description of the principles by which health and care insurance contracts are designed and the interest of the various stakeholders in the process
	  ○ Determination of a suitable design for a product in a given situation
	  ○ Understanding of the relative merits of different product designs

3	**Risks and risk management**
	• Identify and assess various sources of risk to a health and care insurance company
	• Demonstrate the application of reinsurance as a risk management technique
	• Demonstrate the application of underwriting as a risk management technique
	• Propose further ways of managing the risks including:
	  ○ claims management
	  ○ data checks
	  ○ product design
	  ○ managing the distribution process and customer relationship

	○ managing other counterparties ○ other internal processes • Demonstrate the application of asset-liability matching as a risk management technique
4	**Models, Valuation, Monitoring Experience and Setting Assumption** • Models and valuation ○ Main features of a health and care insurance model. ○ Understand and apply the techniques used in pricing health and care insurance products ○ Demonstrate the different uses of actuarial models for decision-making purposes in health and care insurance ○ Discuss the determination of supervisory reserves and solvency capital requirements for health and care insurance company • Monitoring experience and setting assumptions ○ Describe the principles of setting assumptions for health and care insurance business ○ Demonstrate the relevance of experience monitoring to a health insurance company ○ Demonstrate the relevance of analysis of surplus or profit • Analyse hypothetical examples and scenarios in relation to the financial management of health and care insurance companies.

Reference Books:

Sr. No.	Title Author	Edition Year	ISBN Publisher
1.	ActEd Study Material Subject SP1	2019	Actuarial Education Company acted@bpp.com

Nagindas Khandwala College (Autonomous)

B. Com. (Honours) Actuarial Studies

Syllabus and Question Paper Pattern Of

Third Year Semester VI

DSE Group D

(D4) Finance and Investment

Under Academic Autonomy and Credit, Grading and Semester System

With effect from Academic Year 2021-22

Syllabus: Finance and Investments

Objective: The aim of this subject is to provide a basic understanding of financial and investment skills, options to invest for individuals and institutions and how to make investment and disinvestment decisions.

Outcome: After successful completion of this unit, student will be able to

- Understand the need to invest (Knowledge)
- Explain role of regulators for financial markets (Knowledge)
- Outline functions of financial intermediaries in investment process (Knowledge)
- Discuss various Investment Options available and their characteristics (Knowledge)
- Suggest Financial Plans based on Individuals' needs (Analyse, Apply)
- Explain and apply fundamental analysis (Analyse, Apply)
- Explain and apply technical analysis (Analyse, Apply)
- Explain effect of taxes on Investment Options and levels (Analyse, Apply)
- Describe different types of mutual funds (Knowledge)
- Explain role of Fund managers and how would they handle this (Knowledge)

Syllabus: Finance and Investment
Modules at a Glance

Sr. No.	Modules	No. of lectures
Module 1	**Need to Invest, Investment Options for Individuals, Stock Market**	15
Module 2	**Technical Analysis**	15
Module 3	**Fundamental Analysis**	15
Module 4	**Market and Taxation, Risk Management, Mutual Funds, Fund Management and Financial Planning for Individuals**	15
	Total	**60**

	Detailed Syllabus	
Sr. No.	**Modules / Units**	
1	• **Need to Invest, Investment Options for Individuals, Stock Market** The Need to Invest, Regulators, Financial Intermediaries, The IPO Markets, The Stock Markets, The Stock Markets Index, Commonly Used Jargons, Clearing and Settlement Process, Five Corporate Actions and Its Impact on Stock Prices, Key Events and Their Impact on Markets	
2	• **Technical Analysis** • Background, Introducing Technical Analysis, The Chart Types • Candlesticks, Single Candlestick patterns, Multiple candlestick patterns, The Support and Resistance • Volumes, Moving Averages, Indicators, The Fibonacci Retracements, The Dow Theory, The Elliot Wave Theory	
3	• **Fundamental Analysis** • Introduction to Fundamental Analysis, Mindset of an Investor, How to Read the Annual Report of a Company • Understanding the P&L Statement, Understanding Balance Sheet Statement, The Cash Flow statement, The Financial Ratio Analysis • The Investment Due Diligence, Equity Research, Discounted Cash Flow (DCF) and Time Value of Money, The follies of DCF Analysis, Margin of Safety • When to sell? How many stocks in the portfolio?	
4	• **Market and Taxation, Risk Management, Mutual Funds, Fund Management and Financial Planning for Individuals** • Introduction, Basics, Classifying Your Market Activity, Taxation for Investors, Taxation for Traders • Risk, Equity Curve, Expected Returns, Portfolio Optimization, Value at Risk, Position Sizing for Active Trader • Concept of Mutual Funds, Structure of Mutual Funds in India, Classification of Mutual Funds, Evaluation and Selection of Mutual Funds, Portfolio Management Process, Taxation of Mutual Funds, Investment Checklist • Institutional Fund Management: Objective, Time frame, Guarantees, Return Pattern, Reward Payment Pattern, Research, Decision making • Financial Planning, Understanding Withdrawal needs, Insurance, Investing, Tax, Retirement Planning	

Reference Books:

Sr. No.	Title Author	Edition Year	ISBN Publisher
1.	Zerodha Varsity @ https://goo.gl/E2jnve	2016	Zerodha Varsity
2.	The Little Book of Common Sense Investing by Jack Bogle	10th Edition	Wiley
3.	Invest Like A Billionaire by Warren Buffet and George Soros	2008	B N Publishing
4.	Your Money or Your Life by Vicki Robin and Joe Dominguez	2018	Penguin
5.	The Intelligent Investor By Benjamin Graham	2013	Harper Collins Publishers

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Syllabus and Question Paper Pattern Of

Third Year Semester VI

6. Actuarial Business Communication 2

Under Academic Autonomy and Credit, Grading and Semester System

With effect from Academic Year 2021-22

Syllabus: Actuarial Business Communication 2

Objective: The aim of this course is

- to identify appropriate forms of written communication
- to select appropriate language for a non-specialised audience
- to identify the key issues that need to be addressed and convey these in an effective way
- to acquire soft skills required to be well prepared to write a good resume and take on an interview for a relevant job

Outcome: On completion of this course (and using inputs from Actuarial Business Communication 1 course), a successful candidate will be able to:

- redraft a write-up involving a lot of financial/actuarial jargon terms into a language that a person without actuarial background can understand (Apply)
- preparing a shorter write-up from a long write-up involving a lot of financial/actuarial jargon terms (Create)
- write an impressive resume suitable for a related job (Create)
- demonstrate ability to take on an interview very well (Knowledge)

Modules at a Glance

Sr. No.	Modules	No. of lectures
Module 1	**Resume Writing**	15
Module 2	**Interview Preparation**	15
Module 3	**Soft Skills Development**	15
	Total	**45**

Sr. No.	Modules / Units
1	**Resume Writing** • Characteristics of a good resume • The contents in an actuarial resume • Sequence of items • Importance of achievements and activities • Unique Selling Point
2	**Interview Preparation** • developing positive attitude • preparing for situational questions • preparing for personality questions • preparing for technical questions • preparation for telephonic interview • body language and preparation for personal interview • preparation for group discussion
3	**Soft Skills Development** • Communication • Cooperation • Ability • Problem-solving ability • Work ethics • Social skills • Time management • Leadership • Attention to details • Critical thinking • Self-confidence • Handling pressure • Decision making power • Negotiation • Self-motivation • Planning • Workplace conflict management • Initiative work • Flexibility to work • Teamwork • Imagination or vision

Reference Books:

Sr. No.	Title Author	Edition Year	ISBN Publisher
1.	ActEd Study Material CA3	2010	Actuarial Education Company acted@bpp.com
2.	Communication in Organisation by Dalmar, Fisher	2009	Jaico Publication
3.	Business Communication: Process and Product Mary, Allen, Guffey		South Western College Publication
4.	Soft Skills by Dr. K Alex	2009	S. Chand
5.	Resume Magic by Susan Britton Whitcomb	2nd Edition	Jist Works
6.	Interview Magic by Susan Britton Whitcomb	2005	Jist Works

Examination Pattern

40 Marks Continuous Evaluation, 60 Marks Semester-End Examination

[1] **For a Theory Course : Total 100 Marks**

a. Continuous Internal examination shall carry 40% weight (40 marks). It would involve a written test (20 marks), an Assignment or Power Point Presentation (15marks), and Class participation (5 marks).

b. External examination of 2 hours' duration shall carry 60% weight (60 marks). It shall have 4 questions each with 15 marks. Internal options may be present.

c. In the theory examination, a candidate is permitted to use a designated, non-programmable scientific calculator and a specified Actuarial Tables Book.

d. Passing shall be independent in Internal Component called Continuous Internal Evaluation (CIE) and External Component called End Examination (EE).

A student must score at least 40% marks in each component in order to pass in the course.

[2] **For a Practical Course: Total 100 Marks**

a. Continuous Internal examination shall carry 40% weight. It would involve Journal assessment (35% weight) and class participation (5% weight).

b. End examination carrying 60% weight shall be of 3 hours. The examination will involve Viva (20% weight) and an end-exam activity (40% weight). The examiners shall evaluate the performance based on actual working (20% weight) and end- results (20% weight).

c. The practical examination shall be evaluated by one external examiner and one internal examiner.

d. In this practical examination, a candidate is permitted to use a designated, non-programmable scientific calculator, a computer with Excel, R software and a specified Actuarial Tables Book.

A student shall be considered to have PASSED if he/she obtains at least 40% marks in each of CIE and EE component.

[3] **For a Project Course: Total 100 Marks**

a. Continuous Internal examination shall carry 40% weight (40 marks). It would involve a written test under no supervision carrying 35 marks and Class participation carrying 5 marks.

b. End examination will be of 60 marks. The examination will involve Project report (20 marks), a Power point Presentation (20 marks) and Viva (20 marks).

c. The project examination shall be evaluated by one external examiner and one internal examiner

d. Passing shall be independent in Internal Component called Continuous Assessment (CA) and External Component called End Examination (EE).

A student must score at least Grade D based on the total marks in the two components in order to pass in the Project.