HANDBOOK

MASTER OF SCIENCE IN APPLIED STATISTICS

2025 INTAKE

DEPARTMENT OF STATISTICS

UNIVERSTIY OF COLOMBO

1. INTRODUCTION

Statistics is the science of collecting, organizing, analyzing and interpreting data. Concisely, it is the science of learning from data. Applied statistics utilizes mathematical concepts and methods to design and analyze scientific experiments, surveys and samples, clinical trials, market research, environmental and climate studies, and big data systems of businesses. It applies graphical and numerical techniques to explore data and probabilistic models for in depth analysis and predictions. Applied Statistics is the scientific basis for successful data driven decision making and problem solving processes in business, engineering, medicine, agriculture, economics, and many other industries.

The aim of this degree program is to produce high quality professional statisticians with the essential skills and knowledge: design and analyze scientific experiments, surveys and sampling, and clinical trials; data visualization; statistical modeling. These statisticians will apply the skills and knowledge gained through the program in their institutes for successful data driven decision making and problem solving. Moreover, they would be able to train staff in their institutes, and even lead to entrepreneurships. Hence, this will promote data driven decision making and scientific problem solving culture in the country and will improve the productivity and efficiency in both public and private sectors.

Target groups of the program

1. Graduates who are planning to pursue MPhil/PhD in Statistics or related fields.
2. Researchers, scientists, executive officers, and educators in public and private sectors who need knowledge in Statistics and advanced data analytical skills.
3. Graduates employed in public and private sectors who need to switch their careers to data analytics or other related fields.
4. Qualified entrepreneurs and enthusiasts with an interest in Statistics and related fields.

2. RATIONALE

The Master of Science (MSc) in Applied Statistics is designed to address the growing demand for skilled professionals who can harness the power of statistical methods to solve real-world problems across diverse fields. With the rapid expansion of data-driven decision-making in industries such as healthcare, finance, environmental science, and technology, there is a critical need for experts who can analyze, interpret, and apply statistical techniques to provide actionable insights.

Key Drivers for the Program

Interdisciplinary Relevance:

Modern challenges require statistical expertise tailored to specific domains, such as clinical trials in medicine, risk modeling in finance, and environmental sustainability studies. The program equips graduates with the ability to apply statistical tools effectively across multiple disciplines.

Data Revolution:

The advent of big data, artificial intelligence, and machine learning has transformed the role of statistics. Applied statisticians now play a pivotal role in processing, analyzing, and interpreting large and complex datasets. This program provides a strong foundation in classical statistics while introducing advanced computational techniques relevant to contemporary data science.

Workforce Demand:

There is a growing demand globally for professionals skilled in statistical modeling, data analysis, and quantitative reasoning. Industries and research institutions consistently highlight a shortage of statisticians capable of bridging theory and practical application. This program aims to address this gap.

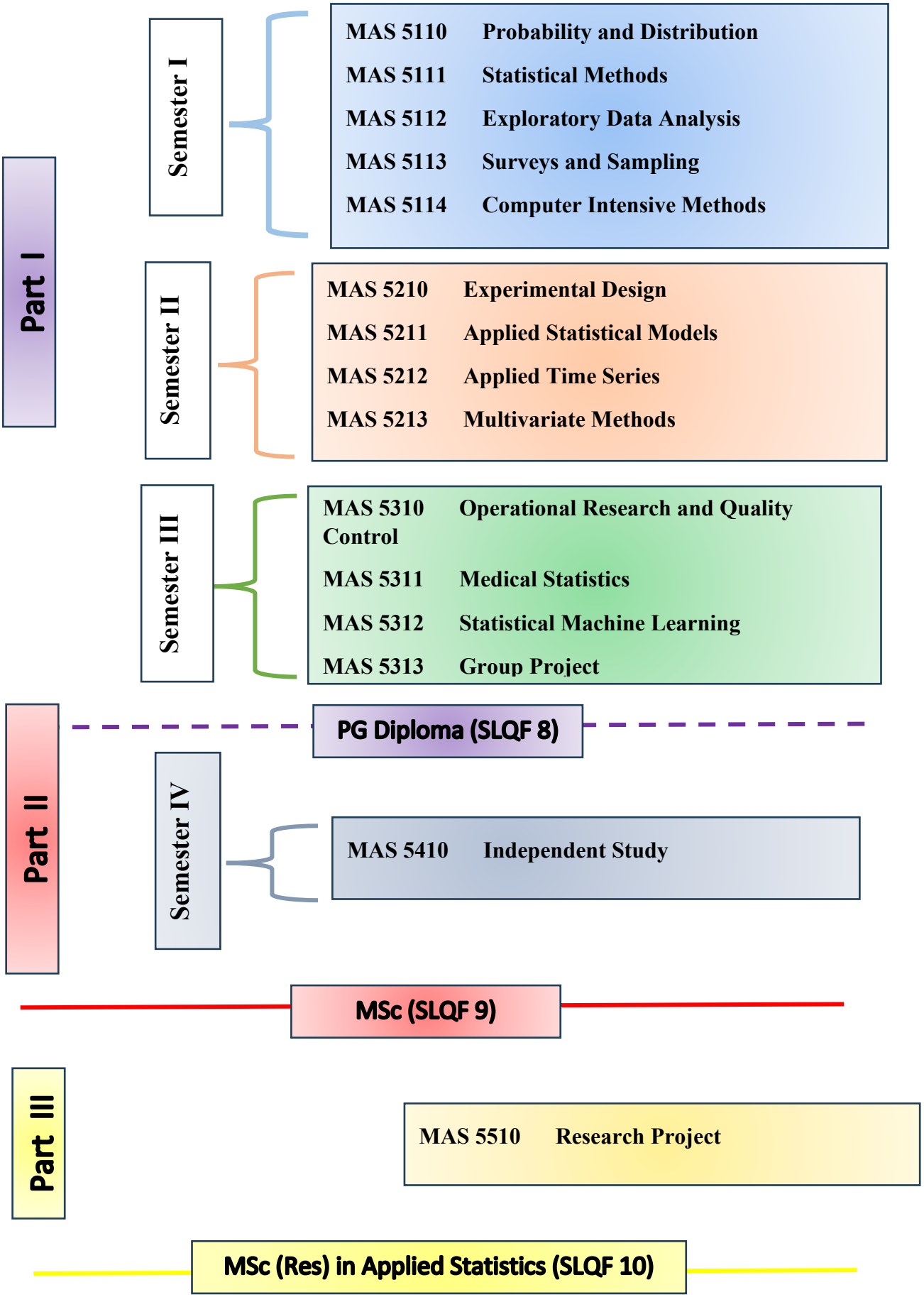
Critical Decision-Making:

Decision-making in areas like public policy, healthcare, and industrial production relies heavily on accurate data interpretation. The MSc in Applied Statistics trains students to become leaders in providing statistical insights that influence strategic and operational decisions

3. OBJECTIVES OF THE PROGRAM

1. To enhance statistics knowledge, data analytical skills, research skills and other necessary skills of graduates who are planning to pursue higher degrees and to provide a postgraduate qualification for them.
2. To produce high quality statisticians who are employable as professionals or to be entrepreneurs.
3. To enhance employment opportunities for graduates from other disciplines
4. To promote data driven decision making culture in the country by producing skillful statisticians.

4. OVERVIEW OF THE PROGRAM



The Program

The MSc in Applied Statistics consists of course modules including theory, practical sessions, a guided independent study, and a guided research project. Theory modules will be conducted in a blended learning mode with online and face-to-face lectures. For a theory module, fifteen direct teaching hours (50 notional hours) of instruction is equivalent to one academic credit and in a practical module thirty hours of work (50 notional hours) is equivalent to one academic credit. The course structure has been revised according to the Master of Science By-Laws No. 8 of 2021 of Faculty of Science, and the guidelines issued by the Sri Lanka Qualifications Framework (SLQF 2015) to fulfill the criteria of Postgraduate Diploma / Master's Degree programs at SLQF levels 8, 9 & 10.

MSc in Applied Statistics consists of 3 parts:

Part I: Coursework (25 credits)

- Part I consists of theory modules, practical modules, and group projects comprising a total of 25 credits and is equivalent to **Level 8** of the SLQF.
- A student who obtains a GPA of **2.70** or above for Part I may be eligible for the award of **the Postgraduate Diploma in Applied Statistics**, upon request, provided the student fulfils other requirements as prescribed by the By-Laws and Rules and Regulations of the University of Colombo.
- Successful completion of **Part I with a minimum GPA of 3.00** is required to proceed to Part II.

Part II: Independent Study (5 credits)

- Part II consists of a guided mini research project of 5 credits. Students undertaking the mini research project are required to carry out the research work under a supervisor/s assigned by the Department.
- Prior to the commencement of the mini research project, the student should submit and present the proposal to a panel of academics in the Department and acquire the approval.
- Students should complete Part II within 6 months.
- Parts I and II contain a minimum of 30 academic credits equivalent to **Level 9** of the SLQF.
- A student who obtains a GPA of **3.00** or above for **Part II** may be eligible for the award of **the Degree of Master of Science in Applied Statistics**, upon request, provided the student fulfils other requirements as prescribed by the By-Laws and Rules and Regulations of the University of Colombo.
- A student who fails to achieve a GPA of **3.00** or above for **Part II** may be eligible to be awarded **the Postgraduate Diploma in Applied Statistics**, upon request, provided the student fulfils other

requirements as prescribed by these By-Laws and Rules and Regulations of the University of Colombo.

- To proceed to **Part III** a student should **achieve a GPA of 3.00 for Part II and complete part I and II within three years from the date of registration**.

Part III: Research Project (30 credits)

- Part III consists of an individual research project of 30 academic credits which should be carried out under the supervision of a qualified supervisor/s. The title of the research project and the supervisor/s should be recommended and approved by the relevant authorities as stipulated by the By-Laws, prior to commencement of research.
- Students who obtain a GPA of **3.00** or above for Part III of the program may be eligible for the award of the **Degree of Master of Science (Research) in Applied Statistics**, provided the students fulfil other requirements as prescribed by the By-Laws and Rules and Regulations of the University of Colombo.
- Parts I, II and III together containing a minimum of 60 academic credits is equivalent to **Level 10** of the SLQF.
- A student who fails to achieve a GPA of **3.00** or above for **Part III** may be eligible to be awarded the **Degree of Master of Science in Applied Statistics**, upon request, provided the student fulfils other requirements as prescribed by these By-Laws and Rules and Regulations of the University of Colombo.

Program duration

- The duration of Parts I and II of the MSc program is 24 months while that of Part III is of a further 12 months.
- Students registered for part II should complete it within 6 months.
- The maximum period allowed to complete the degree is five (05) years from the date of first registration.
- Students who fail to complete Part I and Part II within 3 years from the first registration will not be allowed to register for Part III.

5. CAREER PATH

Data Analyst / Data Scientist

Analyze large datasets to uncover trends and insights that drive strategic decisions. Data analysts and data scientists design predictive models and machine learning algorithms to solve complex problems. They work in technology, retail, finance, and healthcare sectors, using tools like Python, R, and SQL to manage and interpret data for actionable results.

Business Analyst

Guide business decisions by interpreting data and conducting market analysis. Business analysts evaluate organizational performance, identify growth opportunities, and optimize strategies. They work in consulting firms, e-commerce platforms, and marketing agencies, helping businesses achieve competitive advantages through data-driven insights.

Risk Analyst

Assess and manage financial, operational, and credit risks using statistical models. Risk analysts evaluate potential vulnerabilities and develop mitigation strategies to protect organizations. They play a critical role in banking, insurance, and investment firms, ensuring informed decisions to manage uncertainty.

Biostatistician

Apply statistical methods to design and analyze clinical trials or medical research studies. Biostatisticians collaborate with healthcare professionals to evaluate treatment outcomes and medical interventions. They are employed by pharmaceutical companies, public health agencies, and research institutions to ensure robust and ethical data interpretation.

Research Scientist

Conduct innovative research using advanced statistical methodologies. Research scientists design experiments, analyze results, and publish findings in academic journals and conferences. They contribute to the advancement of knowledge in universities, research institutions, and think tanks across a wide range of disciplines.

Statistical Consultant

Provide expert advice on statistical analysis for diverse research projects. Statistical consultants assist with study design, data collection, and data interpretation. They are essential in fields ranging from healthcare to marketing, ensuring that studies are scientifically rigorous and results are reliable.

Environmental Statistician

Analyze environmental data to address challenges like climate change and biodiversity loss. Environmental statisticians work with government bodies, NGOs, and research institutions to support sustainability initiatives and conservation policies through robust data-driven analysis.

Sports Statistician

Use statistical analysis to enhance team performance and predict outcomes in sports. Sports statisticians analyze player and team data, optimize training programs, and guide strategy development. They are employed by professional sports teams and analytics firms.

6. ELIGIBILITY AND SELECTION CRITERIA

A Bachelor's Degree in Science from a UGC recognized university

OR

any other equivalent qualification acceptable to the Senate of the University of Colombo.

The candidates will be selected based on academic merits and/or a screening test, followed by an interview.

7. THE PROGRAM LEARNING OUTCOMES (PLOs)

Upon successful completion of the program students will be able to

PLO1: evaluate the fundamental concepts and theories in Applied Statistics and demonstrate a critical awareness of them

PLO2: identify real world problems which can be solved using appropriate methods and concepts in Applied Statistics

PLO3: design and implement scientific experiments, sample surveys, and clinical trials to gather necessary data

PLO4: apply statistical techniques and utilize appropriate statistical software to organize, summarize and analyze the data in order to extract important information relevant to the problem

PLO5: validate, summarize, interpret and communicate the results effectively both verbally and in writing

PLO6: apply existing statistical theories and techniques or develop new statistical theories and techniques in order to solve complex problems

PLO7: apply data driven decision making process in order to serve as active and contributing members of the society

PLO8: formulate solutions thinking critically, creatively and globally

PLO9: adapt to social, economic and technological new environments

PLO10: demonstrate skills to plan, organize, review, monitor and evaluate independent lifelong learning for continuous self and professional developments

PLO11: demonstrate teamwork skills, social skills, and leadership skills

PLO12: practice ethical standards and professional integrity

8. PROGRAM STRUCTURE

Course Modules

SEMESTER	CODE	COURSE MODULE	HOURS	CREDITS
1	MAS 5110	Probability and Distribution	30L	2
	MAS 5111	Statistical Methods	30L	2
	MAS 5112	Exploratory Data Analysis	15L 30P	2
	MAS 5113	Surveys and Sampling	30L	2
	MAS 5114	Computer Intensive Methods	15L 30P	2
2	MAS 5210	Experimental Design	30L	2
	MAS 5211	Applied Statistical Models	30L	2
	MAS 5212	Applied Time Series	30L	2
	MAS 5213	Multivariate Methods	30L	2
3	MAS 5310	Operational Research and Quality Control	30L	2
	MAS 5311	Medical Statistics	30L	2
	MAS 5312	Statistical Machine Learning	15L 30P	2
	MAS 5313	Group Project	30P	1
Part I : Total Credits				**25**
Part I: PG Diploma in Applied Statistics (SLQF 8)				**25**
4	MAS 5410	Independent Study	150P	5
Part II : Total Credits				**5**
Part I + Part II: MSc in Applied Statistics (SLQF 9)				**30**
	MAS 5510	Research Project	1 Year	30
Part III : Total Credits				**30**
Part I+ Part II+ Part III: MSc (Res) in Applied Statistics (SLQF 10)				**60**

Evaluation

- All the theory modules will be evaluated through written examinations and/or continuous assessments.
- Practical modules will be evaluated through practical assessments and/or continuous assessments and/or presentations and/or viva examinations.
- Independent Study will be evaluated through a written research proposal, a written report, presentations, and a viva examination.
- The Individual Research Project will be evaluated through a written research proposal, a dissertation, presentations, a viva examination, and a manuscript.

Medium of instructions

The medium of instructions and that of assessments/examinations shall be English, and the medium of communication shall also be English.

8. MODE OF DELIVERY

Delivery of Lectures
The lectures are conducted in hybrid mode. The Zoom links for online lectures and any other meetings and presentations are provided to the students. All the exams are in physical mode.

Learning Management System (LMS)

URL: https://sci.cmb.ac.lk/lms/

All the students get access to the MSc LMS. The students are enrolled to the relevant courses in the LMS in each semester. All the lecture materials are uploaded into the LMS. The quizzes are conducted via LMS.

Student Information System (SIS)

URL: https://science.cmb.ac.lk/fms/fms/

Registration for the Examination

- Exam registration is available in the MSc SIS.
- Students can apply for the exam courses that are added by the coordinator to the exam events.
- Students will be able to register/ cancel the exam courses until the deadline has expired.
- Students can view the details until the exam event is closed by the coordinator.

Provisional Result

- Students will be able to see their results (Grade only) in the MSc SIS when the coordinator releases the provisional result for the courses.
- The system generates auto-emails to registered students when releasing results for the exam course.

Final Result

- Students will be able to see their results (Grade) with GPA in the MSc SIS when the Exam branch releases the final result and enables the GPA.

For more information

- Please contact through the email <itsc@sci.cmb.ac.lk>, If you have an issue with logging into the FMS
- Please contact your MSc Coordinator, Faculty of Science, If you have an issue in exam registrations, provisional results or your details are wrong in the system if have not accessed it to update them.
- More: https://science.cmb.ac.lk/fms/fms/instruction

9. COMPLIANCE

- The SLQF level of MSc (Res) in Applied Statistics degree is Level 10.
- The SLQF level of MSc in Applied Statistics degree is Level 9.
- The SLQF level of Post Graduate Diploma in Applied Statistics is Level 8

10.DEGREE AWARDING CRITERIA

Registration

Date of Registration

A person who has been selected as a postgraduate student shall be required to register for the current academic year to follow the particular MSc programme. The date of registration shall be specified by the faculty.

Maintenance of Registration

Registration should be maintained in order to obtain the MSc degree by paying the specified fees.

Postponement of Registration

A student who desires to postpone his/her registration should do so in writing to the Dean, Faculty of Science, giving reasons for and duration of postponement. Each such request shall be considered by the faculty on the recommendation by the Higher Degrees Committee (HDC) and the relevant Department.

Cancellation of Registration

A registration may be canceled by the faculty on the recommendation by the HDC and the relevant Department inadequate progress, for inadequate progress, for academic violation of rules and regulations of the University, failure to pay prescribed fees by the due dates, or any other reasons as decided by the Faculty.

Leave of Absence

Leave of absence may be granted on medical grounds or any other valid reasons acceptable

Examinations

General Instructions

The end-semester final examinations are conducted at the university premises.

The students are required to do the examination registration via Faculty Management System (FMS) as explain above.

The minimum grade a student should achieve to pass a paper/mini project/research component is B-.

Repeat Examinations

If a candidate fails (Grade below B-), the examination he/she shall repeat the entire examination or the required part at the next first available opportunity. Candidates are allowed to repeat an examination paper only once.

Scheme of Evaluation

The Grade Point Average (GPA) shall be computed using grades assigned for all papers in Part I and for Part II. The minimum grade a student should achieve to pass a paper/mini project/research component is B-.

Grade Points

The Grade Points will be assigned using the following table.

Marks Range	Grade	Grade Point
85 – 100	A+	4.00
70 – 84	A	4.00
65 – 69	A-	3.70
60 – 64	B+	3.30
55 – 59	B	3.00
50 – 54	B-	2.70
45 – 49	C+	2.30
40 – 44	C	2.00
35 – 39	C-	1.70
30 – 34	D+	1.30
25 – 29	D	1.00
00 – 24	E	0.00

GPA Calculation

If the Grade Point Average (GPA) of a student is required for any purpose, it shall be calculated using the following equation:

$$\text{GPA} = \frac{\sum w_i g_i}{\sum w_i}$$

Where, wi = number of credit units and gi = grade points for the ith courses
The GPA is rounded to the second decimal place.

Any student who has not appeared for the evaluation of a course may be assigned a GPA of 0.00 Value for such for the purpose of calculating his/her GPA.

Award of Degree

Award of Degree of Master of Science

A student who obtains a GPA of **3.00** or above for Part II may be eligible for the award of the Degree of Master of Science, provided the student fulfills other requirements as prescribed.

No student shall be entitled to the award of the Degree of Master of Science unless he/she has satisfied all the prescribed requirements and he/she has supplicated for the award of the Masters Degree at the relevant Convocation of the University of Colombo.

Award of Postgraduate Diploma

Students who obtain a GPA of **2.70** or above for Part I may be eligible for the award of the Postgraduate Diploma, where applicable, and upon request, provided the student fulfills other requirements as prescribed.

12 AWARDS AND MEDALS

Merit List

Award Criteria

A student who obtains an overall GPA of 3.30 or above (B+ Grade) for Parts I and II of the MSc Degree without repeating any course unit, shall be eligible for the award of a Merit Pass, provided the student obtained at least 2.7 GPV (B- Grade) in all courses followed in the programme, and completes Part I and Part II within three academic years.

Gold medal for Best Performance in Master of Science in Applied Statistics

Eligibility Criteria

The above gold medal is awarded to the best student in the Master degree program among those who complete the degree within three years from the date of first registration.

Selection Criteria:

- The best student is selected from the eligible group of students in the respective intake, who has the highest aggregate among those who have an overall GPA of above 3.00.
- It should be noted that to select the awardees, only the first attempt marks and the corresponding GP values of the paper will be considered.

13 CURRICULUM

<table>
<tr><td>Course Code / Title</td><td colspan="4">MAS 5110/ Probability and Distributions</td></tr>
<tr><td>Credit Value</td><td colspan="4">2</td></tr>
<tr><td>Prerequisites</td><td colspan="4"></td></tr>
<tr><td rowspan="2">Details</td><td>Lectures hours</td><td>Practical hours</td><td>Independent Learning hours</td><td>Notional hours</td></tr>
<tr><td>30</td><td></td><td>70</td><td>100</td></tr>
<tr><td>Rationale</td><td colspan="4">This course introduces probability and theory of probability distributions, and the knowledge gained can be used in decision making under uncertainty.</td></tr>
<tr><td>Intended Learning Outcomes</td><td colspan="4">Upon successful completion of the course, the students will be able to

CLO1: define random variables for real life scenarios

CLO2: calculate probabilities for various events

CLO3: derive theoretical properties of probability distributions

CLO4: apply probability distributions to real life scenarios

CLO5: solve problems using two dimensional random variables</td></tr>
<tr><td>Course Content</td><td colspan="4">Probability, Random Variables and Expectations, Moments and Moment Generating Function, Standard Probability Distributions (Discrete and Continuous), Two Dimensional Random Variables</td></tr>
<tr><td>Method/s of Evaluation:</td><td colspan="2">Continuous Assessments

……20.....%</td><td colspan="2">Final Assessment

……80……%</td></tr>
<tr><td>References</td><td colspan="4">● Mood, A M, Graybill FA, and Boes DC, (1974) Introduction to the theory of statistics McGraw-Hill
● Richard J. Larsen, Morris L. Marx (2012) An introduction to mathematical statistics and its applications 5th Edition, Pearson Education
● Ronald M. W. (2011) Introduction to Business Statistics 7th Edition, South-Western, Cengage Learning</td></tr>
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<tr><td></td><td colspan="4">

Weiss, N. A. (2012) Introductory statistics, 9th Edition, Pearson Education
Douglas A. L, William G. M, and Samuel A. (2012) W. Statistical techniques in business & economics15th Edition, McGraw-Hill/Irwin

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<tr><td>Course Code / Title</td><td colspan="4">MAS 5111/ Statistical Methods</td></tr>
<tr><td>Credit Value</td><td colspan="4">2</td></tr>
<tr><td>Prerequisites</td><td colspan="4"></td></tr>
<tr><td rowspan="2">Details</td><td>Lectures hours</td><td>Practical hours</td><td>Independent Learning hours</td><td>Notional hours</td></tr>
<tr><td>30</td><td></td><td>70</td><td>100</td></tr>
<tr><td>Rationale</td><td colspan="4">Statistical methods cover two major areas in statistics; parametric methods and non-parametric methods. These methods are utilized to make inferences about a population using a random sample. This course provides both theoretical and practical frameworks.</td></tr>
<tr><td>Intended Learning Outcomes</td><td colspan="4">Upon successful completion of this course, students will be able to

CLO1: identify and compute probabilities based on sampling distributions and the central limit theorem

CLO2: understand the theories of statistical inferences and perform statistical inferences involving the mean, variance and proportion and goodness of fit tests using a statistical software

CLO3: identify situations where non-parametric methods are applicable

CLO4: apply appropriate non-parametric statistical method for a particular problem and make inferences using a statistical software</td></tr>
<tr><td>Course Content</td><td colspan="4">Sampling distributions, applications of central limit theorem; point estimation, bias and mean square error; interval estimation, margin of error, determination of sample size; types of errors associated with hypothesis testing, power of the test; Introduction to parametric tests of hypothesis; test of a single mean, test of two means comparison, test of a single variance, test of two variances comparison, test of a single proportion for large sample, test of two variances comparison for large samples; chi-square goodness-of-fit tests, chi-square tests for association; Introduction to non-parametric tests of hypothesis; One sample tests for location; Tests involving two samples: Two independent sample tests for differences in</td></tr>
</table>

	location, Two independent sample tests for differences in spread, Two related sample tests for matched pairs; Tests involving more than two samples: k-Independent Samples, k-related Samples; Miscellaneous tests: Test of randomness, Tests using frequency data; Correlation Tests	
Method/s of Evaluation:	Continuous Assessments ……20.....%	Final Assessment ……80……%
References	● Moore, D. S., Notz, W. I., & Fligner M. A. (2011). *The Basic Practice of Statistics* (6th ed). W. H. Freeman ● Wackerly, D. D., Mendenhall, W., & Scheaffer, R. L. (2008). *Mathematical Statistics with Applications* (7th ed). Cengage Learning ● Conover, W. J. (1999). *Practical Non-Parametric Statistics* (3rd ed.). Wiley & Sons ● Daniel, W. W. (2000). *Applied Non-parametric Statistics* (2nd ed.). Cengage Learning ● Lehmann, E. L., & D'Abrera, H. J. M. (2006). *Nonparametric: statistical methods based on ranks* (1st ed.). Springer	

Course Code / Title	**MAS 5112/ Exploratory Data Analysis**			
Credit Value	2			
Prerequisites				
Details	**Lectures hours**	**Practical hours**	**Independent Learning hours**	**Notional hours**
	15	30	55	100
Rationale	This course is designed to provide the basis for descriptive data analysis techniques that can be used to explore primary or secondary data. Graphical and numerical summaries will be illustrated using real data sets.			
Intended Learning Outcomes	Upon successful completion of the course, students will be able to **CLO1:** identify the types of data **CLO2:** apply suitable graphical and numerical techniques to explore the data using appropriate statistical software			

	CLO3: interpret and communicate graphical summaries and basic descriptive statistics **CLO4:** quantifying and interpreting the associations between variables **CLO5:** demonstrate teamwork skills, social skills and independent learning	
Course Content	Scope of Statistics, Population and Samples, Data and Variables, Misuse of Statistics, Graphical Representation of Data (Univariate, Bivariate, Multivariate), Numerical Representation of Data (Location and Dispersion), Summarizing Grouped Data, Correlation Analysis (Numerical and Categorical data)	
Method/s of Evaluation:	Continuous Assessments ……100.....% (Group Project -50%, 2 Assignments-50%)	Final Assessment ……0……%
References	• David ML, David FS, Timothy CK, and Mark LB (2008) *Statistics for Managers USING Microsoft Excel*, Pearson Education • Ronald M. W. (2011) *Introduction to Business Statistics* 7th Edition, South-Western, Cengage Learning • Weiss, N. A. (2012) *Introductory statistics*, 9th Edition, Pearson Education • Douglas A. L, William G. M, and Samuel A. (2012) W. *Statistical techniques in business & economics*15th Edition, McGraw-Hill/Irwin	

Course Code / Title	**MAS 5113/ Surveys and Sampling**			
Credit Value	2			
Prerequisites	None			
Details	**Lecture hours**	**Practical hours**	**Independent Learning hours**	**Notional hours**
	30		70	100
Rationale	This course concentrates on the statistical aspects of sample selection and estimation of population parameters. It gives guidance on how to design a questionnaire and how to conduct a survey to collect data using			

	a suitable sampling design. A guidance will be given to estimate population parameters by incorporating the sampling design.	
Intended Learning Outcomes	Upon successful completion of the course, students will be able to **CLO1**: recognize the building blocks of random sampling **CLO2:** design a survey and questionnaire for a given research problem **CLO3:** estimate the population parameters in relevance to different sampling techniques **CLO4**: apply survey and sampling techniques to solve real world problems	
Course Content	Introduction to surveys, Advantages of sample surveys, Planning of a survey, Methods of collecting survey data, Survey participation and Survey types, Introduction to questionnaire design, Questionnaire design process, Types of questionnaires, Questionnaire administration, Useful tips in designing a questionnaire, Introduction to sampling, Important Concepts in Sampling, Sampling methods, Estimations under each sampling method, Comparison of sampling methods.	
Method/s of Evaluation:	Continuous Assessments ……20.....%	Final Assessment ……80……%
References	● Lohr, S.L(2009*), Sampling: Design and Analysis* (Second edition) ● Cochran, W. G.(2007), *Sampling Techniques*(Third edition).Wiley ● Kish, L.(1995). *Survey Sampling*. Wiley	

Course Code / Title	**MAS 5114/ Computer Intensive Methods**			
Credit Value	**2**			
Prerequisites	None			
Details	**Lectures hours**	**Practical hours**	**Independent Learning hours**	**Notional hours**
	15	30	55	100
Rationale	Statistical software has become an essential component of applied statistics. It is important to be familiar with a range of statistical packages and also to be familiar with Database management systems. CIM			

	introduces R for data analysis using basic statistical techniques and simple modeling techniques and an introduction to Database management systems.	
Intended Learning Outcomes	Upon successful completion of this course, students will be able to **CLO1:** perform data management using R, **CLO2:** analysis real data using R **CLO3:** write own programs using R **CLO4:** do data management and data analyze using relational and non-relational databases.	
Course Content	Installation of new R packages, Data Management using R, Import/Export data files from/to other formats. Descriptive Analysis, Construction of histograms/charts in R, Use of built-in R functions, Writing own R programs, Random number generation. Properties of Random numbers, Introduction to Simulation. Relational and non-relational databases: introduction; selecting and retrieving data; sorting, filtering and calculating basic statistics; modifying and analyzing data	
Method/s of Evaluation:	Continuous Assessments ……50.....%	Final Assessment ……50……%
References	• Peter, D. (2008). *Introductory statistics with R*.	

Course Code / Title	**MAS 5210 / Experimental Design**			
Credit Value	2			
Prerequisites	Probability Distributions/Statistical Methods			
Details	**Lectures hours**	**Practical hours**	**Independent Learning hours**	**Notional hours**
	30		70	100
Rationale	Statistically designed experiments can be used to establish cause and effect relationships. This course provides a good foundation for this aspect with details of several commonly used statistical designs.			

Intended Learning Outcomes	Upon successful completion of the course, students will be able to **CLO1** : demonstrate knowledge of fundamental concepts in experimental designs **CLO2**: identify real world problems which can be solved by designing appropriate scientific experiments **CLO3:** employ basic planning and designing skills to propose suitable experimental designs **CLO4:** analyze data and interpret results to answer specific questions in comparative experiments	
Course Content	Basic elements of experimental design: experimental unit, treatments, replication, randomization; homogeneous experimental units: completely randomized design with one-way and factorial treatment structures; blocking for increased precision: randomized complete block, Latin square and in-complete block, designs; factorial treatment designs; confounding, Split plot designs.	
Method/s of Evaluation:	Continuous Assessments ……20.....%	Final Assessment ……80……%
References	● Anderson, M., & Whitcomb, P. (2001). *Design of experiments: statistical principles of research design and analysis*. ● Montgomery, D. C. (2017). *Design and analysis of experiments*. John wiley & sons.	

Course Code / Title	**MAS 5211/ Applied Statistical Models**			
Credit Value	2			
Prerequisites	None			
Details	**Lecture hours**	**Practical hours**	**Independent Learning hours**	**Notional hours**
	30		70	100
Rationale	This course provides students with an understanding of different statistical models that could explore and describe various real-life data sets and to model and interpret the data using those models			

Intended Learning Outcomes	Upon successful completion of the course, students will be able to **CLO1** : demonstrate awareness of basic theoretical concepts in linear and non-linear models **CLO2:** analyze categorical and continuous data using appropriate linear and non-linear models and an appropriate statistical software **CLO3:** validate the fitted models using appropriate model diagnostic tools **CLO4**: interpret and communicate the findings effectively **CLO5:** apply concepts in linear and non-linear models to solve real world problems	
Course Content	Introduction; Linear models (General): Relationship between variables, Uses of regression, Simple linear regression model, Parameter estimation, inferences about the model and prediction Multiple regression; Generalized linear models: Introduction, Exponential family of distributions, Defining GLMs, Link functions, Estimation, Inference, Non-linear relationships, Linearization of non-linear models, Problems encountered in non-linear modeling.	
Method/s of Evaluation:	Continuous Assessments ……20.....%	Final Assessment ……80……%
References	● James, G., Witten, D., Hastie, T., & Tibshirani, R. (2013). *An introduction to statistical learning*. New York: springer. ● Dobson, A.J. and Barnett, A.G. (2008). *An Introduction to Generalised Linear Models* (3rdEdition). Chapman & Hall/CRC. ● Agresti, A. (2013) *An Introduction to Categorical Data Analysis* (2nd Edition). Wiley.	

Course Code / Title	**MAS 5212/ Applied Time Series**			
Credit Value	2			
Prerequisites	None			
Details	**Lecture hours**	**Practical hours**	**Independent Learning hours**	**Notional hours**
	30		70	100
Rationale	Special statistical methods are required to analyze time series data in place of the standard statistical methods. This course unit provides knowledge of widely used univariate and multivariate time series modelling techniques with their applications.			

Intended Learning Outcomes	Upon successful completion of this course, students will be able to **CLO1:** identify main features of a time series and describe it **CLO2:** fit classical time series models and ARIMA models, interpret and communicate results **CLO3:** forecast time series models using Box-Jenkins methods, exponential smoothing techniques and Holts-Winter methods **CLO4:** fit VAR models for multivariate time series, interpret and communicate results **CLO5:** test Granger causality and cointegration among time series, and fit ECM models for multivariate time series **CLO6**: Apply univariate and multivariate time series techniques to solve problems that are related time series data	
Course Content	Introduction: Definition, Types of time series, Components of time series, Time plot, Time series decomposition, Transformation, Differencing, Autocorrelation; Stationarity: Stationary & non-stationary time series, Tests for stationarity; Modeling time series: Time series models, Model identification, Parameter estimation, Diagnostic checks, Forecasting, Multivariate time series: VAR models, Granger causality, co-integration, ECM model	
Method/s of Evaluation:	Continuous Assessments ……20.....%	Final Assessment ……80……%
References	● Makridakis, S., Wheelwright, S. C., & Hyndman, R. J. (2008). *Forecasting methods and applications*. John wiley & sons. ● Chatfield, C., & Xing, H. (2019). *The analysis of time series: an introduction with R*. Chapman and hall/CRC. ● Box, G. E., Jenkins, G. M., Reinsel, G. C., & Ljung, G. M. (2015). *Time series analysis: forecasting and control*. John Wiley & Sons. ● Fuller, W. A. (2009). *Introduction to statistical time series* (2nd ed.). John Wiley & Sons. ● Alexander, C. (2001). Market models. *A Guide to Financial Data Analysis*, *1*.	

Course Code / Title	**MAS 5213/ Multivariate Methods**
Credit Value	2

<table>
<tr><td>Prerequisites</td><td colspan="4">None</td></tr>
<tr><td rowspan="2">Details</td><td>Lecture hours</td><td>Practical hours</td><td>Independent Learning hours</td><td>Notional hours</td></tr>
<tr><td>30</td><td></td><td>70</td><td>100</td></tr>
<tr><td>Rationale</td><td colspan="4">In real life, many processes are affected by the actions of not only one variable but several variables simultaneously. Multivariate analysis is a natural tool to analyze several variables (possibly correlated) at the same time to have insight of the combined effect, if any. This course provides some theoretical background as well as a good practical foundation for commonly used multivariate techniques.</td></tr>
<tr><td>Intended Learning Outcomes</td><td colspan="4">Upon successful completion of this course, students will be able to

CLO1: demonstrate critical awareness of basic concepts in multivariate data analysis

CLO2: apply the related multivariate techniques to data with multiple measurements satisfying the underlying theories and assumptions

CLO3: validate, interpret and communicate the findings effectively

CLO4: demonstrate basic computer skills in analyzing such data with the help of appropriate statistical packages</td></tr>
<tr><td>Course Content</td><td colspan="4">Introductory matrix algebra. Multivariate data descriptions. Multivariate Normal Distribution, Checking for multivariate normality. Inference on mean vector and covariance matrix, Profile analysis, Principal Component Analysis, Factor Analysis, Discriminant analysis, Cluster analysis.</td></tr>
<tr><td>Method/s of Evaluation:</td><td colspan="2">Continuous Assessments

……20%.....</td><td colspan="2">Final Assessment

……80%…….</td></tr>
<tr><td>References</td><td colspan="4">● Johnson, D. E. (1998). Applied Multivariate Methods for Data Analysts (1st ed.). Duxbury Press
● Johnson, R. A., & Wichern, D. W. (2013). Applied Multivariate Statistical Analysis (3rd ed.). Pearson Education Limited
● Afifi, A., May, S., & Clark, V. A. (2003). Computer Aided Multivariate Analysis (4th ed.). CRC Press</td></tr>
</table>

Course Code / Title	**MAS 5310/ Operational Research and Quality Control**

<table>
<tr><td>Credit Value</td><td colspan="4">2</td></tr>
<tr><td>Prerequisites</td><td colspan="4">None</td></tr>
<tr><td rowspan="2">Details</td><td>Lecture hours</td><td>Practical hours</td><td>Independent Learning hours</td><td>Notional hours</td></tr>
<tr><td>30</td><td></td><td>70</td><td>100</td></tr>
<tr><td>Rationale</td><td colspan="4">Decision makers in any field require to utilize available resources, plan and coordinate activities under many constraints. Operational research and quality control techniques can be used to assist such decision-making activities in an optimum way. This course unit provides a good theoretical as well as practical foundation on few key operational research and quality control related techniques.</td></tr>
<tr><td>Intended Learning Outcomes</td><td colspan="4">Upon successful completion of this course, students will be able to

CLO1: demonstrate the knowledge of fundamental concepts in operational research and quality control

CLO2: apply scientific methods and quantitative techniques to obtain optimal results/solutions for suitable real-world scenarios

CLO3: determine the quality of products using the scientific methods

CLO4: use control charts for monitoring continuous and discrete quality characteristics in a production process

CLO5: setup sampling plans to accept a lot</td></tr>
<tr><td>Course Content</td><td colspan="4">Linear programming, Duality theory, Sensitivity Analysis, Transportation problems, Assignment problems, Use of Packages to solve OR problems, Eight Dimensions of Quality, Management Aspects of Quality, Quality Costs, Statistical Methods for Quality control and Improvement, Magnificent Seven in Statistical Process Control, Process Control, Control Charts, Sampling Inspection, Acceptance Sampling</td></tr>
<tr><td>Method/s of Evaluation:</td><td colspan="2">Continuous Assessments

……20.....%</td><td colspan="2">Final Assessment

……80……%</td></tr>
<tr><td>References</td><td colspan="4">● Hamdy A. Taha. 2006. Operations Research: An Introduction (8th Edition). Prentice-Hall, Inc., USA.
● Frederick S. Hillier and Gerald J. Lieberman 2001. Introduction to Operations Research, McGraw-Hill, USA.
● Montgeomery DC (2005), Introduction to Statistical Quality Control (Fifth Edution) John Wily & Sons</td></tr>
<tr><td>Course Code / Title</td><td colspan="4">MAS 5311/ Medical Statistics</td></tr>
</table>

<table>
<tr><td>Credit Value</td><td colspan="4">2</td></tr>
<tr><td>Prerequisites</td><td colspan="4">None</td></tr>
<tr><td rowspan="2">Details</td><td>Lecture hours</td><td>Practical hours</td><td>Independent Learning hours</td><td>Notional hours</td></tr>
<tr><td>30</td><td></td><td>70</td><td>100</td></tr>
<tr><td>Rationale</td><td colspan="4">This course constitutes statistical methods for analyzing data on medicine and health sciences which include epidemiology, public health and clinical research.</td></tr>
<tr><td>Intended Learning Outcomes</td><td colspan="4">Upon successful completion of the course, students will be able to

CLO1: define, compute and interpret statistics related to biomedical studies

CLO2: design epidemiological studies and clinical trials

CLO3: identify and apply statistical models in epidemiological studies and clinical trials</td></tr>
<tr><td>Course Content</td><td colspan="4">Introduction; Epidemiology: basic designs and analysis of epidemiological studies, measuring association, confounding and interaction; Clinical trials: introduction, ethics for clinical trials, phases of clinical trials, design and analysis of basic studies in clinical trials, allocation to treatment, sample size determination; Survival Analysis: functions for survival data, log-rank test for comparing two survival curves, Non-parametric and parametric methods of modeling survival data.</td></tr>
<tr><td>Method/s of Evaluation:</td><td colspan="2">Continuous Assessments

……20.....%</td><td colspan="2">Final Assessment

……80……%</td></tr>
<tr><td>References</td><td colspan="4">● Armitage, P., Berry, G. and Mathews, J.N.C (2002). Statistical methods in Medical Research (4th Edition). Blackwell Science.
● Schlesselman J.J. (1983). Case-control Studies: Design, Conduct, Analysis. Oxford University Press.
● Pocock S.J. (2002). Clinical Trials: A Practical Approach. John Wiley and Sons.
● Collett D. (2003). Modelling survival Data in Medical Research (2nd Edition). Chapman and Hall/CRC</td></tr>
</table>

Course Code / Title	**MAS 5312/ Statistical Machine Learning**
Credit Value	2
Prerequisites	Computer Intensive Methods and Applied Statistical Models

<table>
<tr><td rowspan="2">Details</td><td>Lecture hours</td><td>Practical hours</td><td>Independent Learning hours</td><td>Notional hours</td></tr>
<tr><td>15</td><td>30</td><td>55</td><td>100</td></tr>
<tr><td>Rationale</td><td colspan="4">With the development of computing technology, many new learning techniques have been introduced to the field of decision sciences. This course gives a complete introduction to some of these learning techniques and explains them in statistical angle. In addition, students will be given hands-on experience analyzing real world data using these new learning techniques.</td></tr>
<tr><td>Intended Learning Outcomes</td><td colspan="4">Upon successful completion of this course, students will be able to

CLO1: demonstrate awareness of fundamental concepts in Statistical Machine Learning

CLO2: apply appropriate learning techniques to raw data using an appropriate computing tool in order to extract important information

CLO3: evaluate findings, interpret, and report the results so that non-statisticians can easily understand

CLO4: demonstrate, problem solving skills, team work skills, Social skills

CLO5: demonstrate skills to plan, organize, review, monitor and evaluate independent learning and self-development</td></tr>
<tr><td>Course Content</td><td colspan="4">Introduction to bias variance tradeoff. Regularized regression: Ridge regression, Lasso regression, Elastic net. KNN, Tree-based methods: regression trees, classification trees, bagging, random forest, boosting. Clustering.</td></tr>
<tr><td>Method/s of Evaluation:</td><td colspan="2">Continuous Assessments

……100.....%

(Group Project1-50%, Group Project2-50%)</td><td colspan="2">Final Assessment

……0……%</td></tr>
<tr><td>References</td><td colspan="4">● James, G., Witten, D., Hastie, T., & Tibshirani, R. (2013). An introduction to statistical learning. New York: springer.
● Friedman, J., Hastie, T., & Tibshirani, R. (2001). The elements of statistical learning. New York: Springer series in statistics.
● Kuhn, M., & Johnson, K. (2013). Applied predictive modeling. New York: Springer.</td></tr>
</table>

<table>
<tr><td>Course Code / Title</td><td colspan="4">MAS 5313/ Group Project</td></tr>
<tr><td>Credit Value</td><td colspan="4">1</td></tr>
<tr><td>Prerequisites</td><td colspan="4"></td></tr>
<tr><td rowspan="2">Details</td><td>Lectures hours</td><td>Practical hours</td><td>Independent Learning hours</td><td>Notional hours</td></tr>
<tr><td></td><td>30</td><td>20</td><td>50</td></tr>
<tr><td>Rationale</td><td colspan="4">This provides hands-on experience in solving real world problems using the statistical knowledge gained throughout the program. Moreover, this course gives an opportunity for students to work as a team in order to achieve common goals.</td></tr>
<tr><td>Intended Learning Outcomes</td><td colspan="4">Upon successful completion of this project, students will be able to

CLO1: demonstrate awareness of basic concepts in Applied Statistics

CLO2: identify real world problems which can be solved using tools in Applied Statistics

CLO3: apply the selected techniques and solve problems using appropriate statistical software

CLO4: validate, interpret and communicate the findings

CLO5: develop independent learning skills, teamwork skills, and social skills

CLO6: practice ethical standards and professional integrity</td></tr>
<tr><td>Course Content</td><td colspan="4">Each group</td></tr>
<tr><td>Method/s of Evaluation:</td><td colspan="2">Continuous Assessments

……0.....%</td><td colspan="2">Final Assessment

……100……%

(Report- 65%, Viva- 25%, Supervision- 10%)</td></tr>
</table>

<table>
<tr><td>References</td><td colspan="4"></td></tr>
<tr><td>Course Code / Title</td><td colspan="4">MAS 5410/ Independent Study</td></tr>
<tr><td>Credit Value</td><td colspan="4">5</td></tr>
<tr><td>Prerequisites</td><td colspan="4">Achieve a minimum GPA of 3.00 in Part I</td></tr>
<tr><td rowspan="2">Details</td><td>Lectures hours</td><td>Practical hours</td><td>Independent Learning hours</td><td>Notional hours</td></tr>
<tr><td></td><td>150</td><td>350</td><td>500</td></tr>
<tr><td>Rationale</td><td colspan="4">This provides hands-on experience in solving real world problems using the statistical knowledge gained throughout the program.</td></tr>
<tr><td>Intended Learning Outcomes</td><td colspan="4">Upon successful completion of this project, students will be able to

CLO1: formulate research problems/hypotheses and design appropriate mythologies to solve/test research problems/hypotheses using concepts and techniques in Applied Statistics

CLO2: apply appropriate statistical concepts and techniques to solve/test research problems/hypotheses

CLO3: validate, report and communicate the findings effectively

CLO4: plan, organize, monitor and review independent learning

CLO5: demonstrate social skills and practice ethical standards and professional integrity</td></tr>
<tr><td>Course Content</td><td colspan="4">Each student need to do an independent study (mini research project) on a specific research topic related to applied Statistics under the supervision of an academic staff member and submit a thesis.</td></tr>
<tr><td>Method/s of Evaluation:</td><td colspan="2">Continuous Assessments

……40.....%</td><td colspan="2">Final Assessment

……60……%

(Report-20%, Viva-30%, Supervision-10%)</td></tr>
<tr><td>References</td><td colspan="4"></td></tr>
</table>

<table>
<tr><td>Course Code / Title</td><td colspan="4">MAS 5510/ Research Project</td></tr>
<tr><td>Credit Value</td><td colspan="4">30</td></tr>
<tr><td>Prerequisites</td><td colspan="4">Achieve a GPA of 3.00 for Part II and complete parts I and II within three years from the date of registration.</td></tr>
<tr><td rowspan="2">Details</td><td>Lectures hours</td><td>Practical hours</td><td>Independent Learning hours</td><td>Notional hours</td></tr>
<tr><td></td><td>900</td><td>2100</td><td>3000</td></tr>
<tr><td>Rationale</td><td colspan="4">This gives an opportunity to work closely with a faculty member who is an experienced researcher in order to solve a research problem related to statistics. Students will explore new areas in statistics, improve critical thinking and problem solving skills. In addition, this project will contribute new knowledge to the field of statistics.</td></tr>
<tr><td>Intended Learning Outcomes</td><td colspan="4">Upon successful completion of this project, students will be able to

CLO1: critically and thoroughly review scholarly articles and identify gaps and potentials in the research area

CLO2: formulate an appropriate research problem with aims and objectives

CLO3: design and implement an appropriate research methodology in order to solve the research problem

CLO4: synthesize a dissertation and defend it

CLO5: plan, organize, monitor and review independent learning

CLO6: demonstrate social skills and practice ethical standards and professional integrity</td></tr>
</table>

Course Content	Each Student needs to do a research project on a given specific topic related to Applied Statistics under the supervision of an academic staff member and submit a dissertation.	
Method/s of Evaluation:	Continuous Assessments ……0.....%	Final Assessment ……100……% (Thesis-65%, Viva-25%, Supervision-10%)
References		

14.MAP OF THE ALQF OUTCOMES

Courses vs Program Learning Outcomes (PLOs) Map

H - Highly correlated; M - Moderately correlated; L – Correlated

Course Code	Course Title	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO 6	PLO 7	PLO 8	PLO 9	PLO 10	PLO 11	PLO 12
MAS 5110	Probability and Distribution	H	H		M	M	H	H	H	M	L	L	M
MAS 5111	Statistical Methods	H	H	L	H	H	H	H	H	M	L	L	M
MAS 5112	Exploratory Data Analysis	H	H	L	H	H	M	H	M	H	H	H	M
MAS 5113	Surveys and Sampling	H	H	H	H	M	H	H	H	L	M	L	H
MAS 5114	Computer Intensive Methods	H	H		H	M	H	H	H	H	L	L	M
MAS 5210	Experimental Design	H	H	H	H	H	H	H	H	M	L	L	H
MAS 5211	Applied Statistical Models	H	H	L	H	H	H	H	H	M	L	L	L
MAS 5212	Applied Time Series	H	H		H	H	H	H	L	M	L	L	L
MAS 5213	Multivariate Methods	H	H		H	H	H	H	H	M	L	L	L
MAS 5310	Operational Research and Quality Control	H	H		H	M	H	H	H	M	L	L	L
MAS 5311	Medical Statistics	H	H	H	H	H	H	H	H	L	L	L	H
MAS 5312	Statistical Machine Learning	H	H	L	H	H	H	H	H	H	H	H	H
MAS 5313	Group Project	H	H	M	H	H	H	H	H	H	H	H	H
MAS 5410	Independent Study	H	H	M	H	H	H	H	H	H	H	H	H
MAS 5510	Research Project	H	H	H	H	H	H	H	H	H	H	H	H

Course modules vs Level Descriptors Learning Outcomes for SLQF Level 10

H - Highly correlated; M - Moderately correlated; L - Correlated

Course Code	Course Title	Level Descriptors Learning Outcomes for SLQF Level											
		1	2	3	4	5	6	7	8	9	10	11	12
		Subject / Theoretical Knowledge	Practical Knowledge and Application	Communication	Teamwork and Leadership	Creativity and Problem Solving	Managerial and Entrepreneurship	Information Usage and Management	Networking and Social Skills	Adaptability and Flexibility	Attitudes, Values and Professionalism	Vision for Life	Updating Self/ Lifelong Learning
		PLO1	PLO2 PLO3 PLO4 PLO5	PLO5	PLO11	PLO6 PLO8	PLO2 PLO10	PLO4	PLO11	PLO9	PLO12 PLO10	PLO7	PLO10
MAS 5110	Probability and Distribution	H	H	M	L	H	L	M	L	L	M	H	L
MAS 5111	Statistical Methods	H	H	H	L	H	L	H	L	M	M	H	L
MAS 5112	Exploratory Data Analysis	H	H	H	H	H	L	H	H	H	M	H	H
MAS 5113	Surveys and Sampling	H	H	M	L	H	M	H	L	L	H	H	M
MAS 5114	Computer Intensive Methods	H	H	M	L	H	M	H	L	H	M	H	L
MAS 5210	Experimental Design	H	H	H	L	H	M	H	L	M	H	H	L
MAS 5211	Applied Statistical Models	H	H	H	L	H	M	H	L	M	L	H	L
MAS 5212	Applied Time Series	H	H	H	L	H	M	H	L	M	L	H	L
MAS 5213	Multivariate Methods	H	H	H	L	H	M	H	L	M	L	H	L
MAS 5310	Operational Research and Quality Control	H	H	M	L	H	M	H	L	M	L	H	L

MAS 5311	Medical Statistics	H	H	H	L	H	M	H	L	L	H	H	L
MAS 5312	Statistical Machine Learning	H	H	H	H	H	H	H	H	H	H	H	H
MAS 5313	Group Project	H	H	H	H	H	H	H	H	H	H	H	H
MAS 5410	Independent Study	H	H	H	H	H	H	H	H	H	H	H	H
MAS 5510	Research Project	H	H	H	H	H	H	H	H	H	H	H	H

Course Learning Outcomes Mapped to SLQF Learning Outcomes

Program Learning Outcomes (PLOs)		PLO1	PLO2, PLO3 PLO4 PLO5	PLO5	PLO11	PLO6 PLO8	PLO2 PLO10	PLO4	PLO11	PLO9	PLO12	PLO7	PLO10
Semester	**Course Unit**	Subject / Theoretical Knowledge	Practical Knowledge and Application	Communication	Teamwork and Leadership	Creativity and Problem Solving	Managerial and Entrepreneurship	Information Usage and Management	Networking and Social Skills	Adaptability and Flexibility	Attitudes, Values and Professionalism	Vision for Life	Updating Self/ Lifelong Learning
1	MAS 5110	CLO1, 2, 3 OL, L, ES, SEQ	CLO2,4, 5 A, RE, ES			CLO 4, 5 A, RE, ES SEQ						CLO4,5 A, RE, ES	
	MAS 5111	CLO1, 2 OL, L, ES, SEQ	CLO3, 4 A, RE, ES	CLO4 A, RE, ES		CLO4 A, RE ES, SEQ		CLO3, 4 A, RE				CLO4 A, RE, ES	
	MAS 5112	CLO1, 2 OL, L, RE	CLO 2, 3, 4 GP, P, RE	CLO3 P, RE, VV	CLO5 GP, P,VV	CLO2 GP, RE, P		CLO2 GP, P, RE	CLO5 GP, P, VV	CLO2 GP,P,VV		CLO2,3,4 GP, P, RE	CLO5 GP, P, VV
	MAS 5113	CLO1, 3 OL, L, ES, SEQ	CLO2, 4 RF, PJ, A, ES			CLO2, 4 PJ, A, ES, SEQ		CLO2, 4 PJ, A			CLO2 PJ, A	CLO2,4 PJ, A, ES	
	MAS 5114	CLO1, 3, 4 OL, L, ES, SEQ	CLO2, 4 A, PJ, ES			CLO 2, 4		CLO 1,2,4 PJ, A		CLO1,3,4 PJ, A		CLO1,2,4 PJ, A, ES	

						PJ, A, ES, SEQ							
2	MAS 5210	CLO1, 3 OL, L , ES, SEQ	CLO2,4 A, PJ, RE, ES	CLO3 A, RE, ES		CLO2,3 PJ, A, ES, SEQ		CLO4 PJ, A			CLO3 PJ, A	CLO2,3,4 PJ, A, RE, ES	
	MAS 5211	CLO1 OL, L,ES, SEQ	CLO2,3,4 A, PJ, RE, ES	CLO4 A, PJ, RE, ES		CLO5 A, PJ, RE, ES, SEQ		CLO2 PJ, A, RE				CLO2,3,4,5 PJ, A, RE, ES	
	MAS 5212	CLO1,2,3,4,5 OL, L, ES, SEQ	CLO2,3,4,5 A,PJ, RE, ES	CLO2,4,5 A, PJ,RE, ES		CLO6 A, PJ, RE, ES		CLO2,3,4, 5 PJ, A, RE				CLO2,3,4,5 ,6 PJ, A, RE, ES	
	MAS 5213	CLO1 OL, L, ES, SEQ	CLO2, 4 A, PJ,,ES	CLO3 A, PJ, RE, ES		CLO2,4 A, PJ,RE, ES		CLO4 A, PJ, RE				CLO2,3,4 PJ, A, RE, ES	
3	MAS 5310	CLO1 OL, L, ES, SEQ	CLO2,3,4,5 A, PJ, ES			CLO2, 5 A, PJ, ES		CLO2,4 A, PJ				CLO2,3,4,5 A, PJ, ES	
	MAS 5311	CLO1, 2 OL, L,ES, SEQ	CLO1,2,3 A, PJ,RF,ES	CLO1 A, PJ, ES		CLO2, 3 A, PR, ES		CLO2, 3 A, PJ			CLO2 A, PJ, RF	CLO1,3 A, PJ, ES	
	MAS 5312	CLO1 OL,L,RE	CLO2,3 GP, RE, RF	CLO3 RE, P, VV	CLO4 GP,P	CLO2,3,4 GP,P,RE	CLO4,5 GP,P, RE	CLO2,3 GP, P,RE	CLO4 GP, P, VV	CLO2 GP, P, VV	CLO5 GP, P, VV	CLO2,3,4 GP, P, RE, VV	CLO5 GP,P, VV
	MAS 5313	CLO1	CLO2,3,4	CLO4	CLO5	CLO2,3,4	CLO2	CLO2,3	CLO5	CLO3	CLO6	CLO2,3,4	CLO5

		RE, VV	S, RE, VV	RE, VV	S, VV	RE, VV	RE, VV	VV, RE	S, VV	S, RE, VV	S, VV,RE	S, RE, VV	S, RE,VV
4	MAS 5410	CLO1 RP, P, VV, RF	CLO1,2,3 RP, P, VV	CLO3 S,P, VV	CLO1 S,RP, RF, P	CLO1,2,3 RP, RF, P, VV	CLO1,4 RP, RF, VV	CLO2 RF,RP, P	CLO5 S,P, VV	CLO2 S,.RP, P, VV	CLO5 RP, P,VV	CLO1,2,3 RP, P,VV	CLO4 RP, P,RF, VV
	MAS 5510	CLO1, 2 RP, RF, P, VV	CLO1,2,3,4 RP, P,VV	CLO4 S,RP,P, VV	CLO2,3 S,RP,P, VV	CLO1,2,3 RP, RF, P, VV	CLO1,2,3 RP, P,VV	CLO1,2,3 RF, RP,P	CLO6 S, P,VV	CLO3, 4 S, RP, P, VV	CLO6 RP,P,VV	CLO1,2,3 RP,P,VV	CLO5 RP, P,VV

CLO: Course learning outcomes
PR: Practical
GP: Group Projects
VV: viva voice

RE: Reports
IV: Industrial Visit
MCQ: Multiple Choice Questions
A: Assignment

L: Lecture
RP: Research Project
SEQ: Structured Essay Questions
PT: Practical Test

OL: Online activities
PJ: Projects
ES: Essay Questions
T: Tutorials

RF: Reference Work
SE: Seminars
P: Presentations
S: Supervision

PANEL OF LECTURERS

Dr. R.A.B. Abeygunawardana, MSc (Colombo), M.Sc (NUS, Singapore)
(Statistical Quality Control)

Prof.(Miss). C.D. Tilakaratne, PhD (Ballarat, AUS)

(Time Series, Data Mining)

Dr.(Mrs). M.D.T. Attygalle, PhD (Lancaster, UK)

(Statistical Modelling)

Dr.(Mrs) J.H.D.S.P. Tissera, PhD (La trobe, AUS)

(Simulations, Statistical Computing, Computational Statistics)

Dr.(Mrs) C.H. Magalla, PhD (Kansas State, USA)

(Linear and non-linear Models, Multivariate Statistics)

Mr. E.R.A.D.Bandara, M.Phil (University of Colombo)

(Non-replicated experiments, Statistical Methods)

Dr. G. P. Lakraj, PhD (Texas Tech, USA)

(Functional Data Analysis, Time Series Data Analysis)

Dr.(Miss). R.V. Jayatillake, PhD (Old Dominion, USA)

(Bio Statistics, Linear Models, Bayesian Statistics)

Dr. S.D Viswakula, PhD (Old Dominion, USA)

(Biostatistics, Genomic Biostatistics, Bioinformatics)

Dr. A.A. Sunethra, PhD (University of Colombo),

(Joint Modelling, Survival Analysis)

Dr. K.A.D. Deshani, PhD (University of Colombo), M.Sc. (University of Moratuwa)

(Operational Research, Data Mining)

Dr. H.A.S.G. Dharmarathne, PhD(University of Melbourne), MSc(La trobe), BSc (Sri Jayewardenepura) (Time Series Analysis, Econometrics)

Dr. I. T. Jayamanne, PhD (University of Colombo), MFE (University of Colombo)

(Statistical Modeling, Data matching, Survey sampling)

Dr. G.H.S Karunarathna, PhD (University of Colombo)

(Statistical Modeling, Multivariate Multilevel Modeling, Medical Statistics)

Dr. G A C N Priyadarshani, PhD(La Trobe University)

(Robust Statistics, Statistical Inference, Time Series Analysis)

Dr. D. S. Wickramarachchi, PhD (NUS, Singapore)

(Casual Medication analysis, semiparametric methods, multilevel modeling)

PROGRAMME COORDINATOR (2025)

Dr G.H.S. Karunarathna, Senior Lecturer,

Department of Statistics, University of Colombo

Email: hasani@stat.cmb.ac.lk

15. REQUEST FORMS

Student Request Form

Name of student	Reg. No.	Signature
	Email:	Mobile:
Name of Programme		Department
Date of Reg.	Reg. No.	Date of Request:

Nature of Request (Tick as appropriate)

	Deferment of registration
	Medical (for examinations) Course: ……..
	Overseas Leave
	Repeat Examination Course: ……..
	Fallback option PG Dip.: …… MSc: ……
	Extension (beyond the permitted period) Period: ……..
	Other

Observations of Coordinator

Name of Coordinator:	Name of Head:
Signature:	Signature:
Date:	Date: