

GANDHI INSTITUTE OF TECHNOLOGY AND MANAGEMENT (GITAM)

(Deemed to be University)

VISAKHAPATNAM * HYDERABAD * BENGALURU

Accredited by NAAC with A⁺⁺ Grade

GITAM School of Science



CURRICULUM AND SYLLABUS

4 Year Undergraduate Programme

UMATH06: B.Sc. Statistics

w.e.f. 2024-25 admitted batch

(Updated on July 2024)

Academic Regulations

**Applicable for the Undergraduate Programmes in the
Schools of Business(except B.Com), Humanities & Social Sciences
and Science (except B.Sc.(CSCS), B.Optomety, B.C.A)**

<https://www.gitam.edu/academics/academic-regulations>

GANDHI INSTITUTE OF TECHNOLOGY AND MANAGEMENT

Vision

GITAM will be an exceptional knowledge-driven institution advancing on a culture of honesty and compassion to make a difference to the world.

Mission

- Build a dynamic application-oriented education ecosystem immersed in holistic development.
- Nurture valuable futures with global perspectives for our students by helping them find their ikigai.
- Drive impactful integrated research programmes to generate new knowledge, guided by integrity, collaboration, and entrepreneurial spirit.
- Permeate a culture of kindness within GITAM, fostering passionate contributors.

Quality Policy

To achieve global standards and excellence in teaching, research, and consultancy by creating an environment in which the faculty and students share a passion for creating, sharing and applying knowledge to continuously improve the quality of education.

GITAM School of Science

Vision

To nurture outstanding Science Education and build a vibrant world-class research and innovation ecosystem.

Mission

1. To provide a flexible, responsive, and adaptive curriculum that emphasizes experiential learning and allows students to realize their full potential.
2. To develop high-impact research knowledge and solutions to improve the communities in which we live.
3. To promote a culture of high curiosity, enterprising mindset and keen desire to contribute to society.
4. To inculcate empathy, integrity, and trust in the GITAM fraternity with a strong commitment towards society and environment.

VISION AND MISSION OF THE DEPARTMENT

VISION

MISSION

UMATH06: B.Sc. Statistics
(w.e.f.2023-24 Admitted Batch)

Programme Educational Objectives (PEOs)

- PEO 1:** To apply basic knowledge of statistics to understand the data interpretation problems.
- PEO 2:** To develop complexity data problem solving techniques using statistical tools.
- PEO 3:** To establish the methodologies for core statistical problems.
- PEO 4:** To implement computer solution methods for large systems.
- PEO 5:** To imbibe professional and ethical responsibility towards the society.

PEO Articulation

| | PEO1 | PEO2 | PEO3 | PEO4 | PEO5 |
|-----------|-------------|-------------|-------------|-------------|-------------|
| M1 | 3 | 2 | 3 | 1 | 2 |
| M2 | 2 | 2 | 2 | 1 | 2 |
| M3 | 2 | 2 | 2 | 1 | 2 |
| M4 | 3 | 3 | 3 | 2 | 2 |

3 - High Correlation, 2 - Medium Correlation, 1 - Low Correlation

UMATH06: B.Sc. Statistics

Programme Outcomes (POs) and Programme Specific Outcomes (PSOs)

At the end of the Programme the students would be able to demonstrate:

- PO1:** Complex problem-solving:
- To solve different kinds of problems in familiar and non-familiar contexts and apply the learning to real-life situations.
- PO2:** Critical thinking:
- Apply analytic thought to a body of knowledge, including the analysis and evaluation of policies, and practices, as well as evidence, arguments, claims, beliefs, and the reliability and relevance of evidence.
 - Identify relevant assumptions or implications and formulate coherent arguments.
 - Identify logical flaws and holes in the arguments of others.
 - Analyze and synthesize data from a variety of sources and draw valid conclusions and support them with evidence and examples.
- PO3:** Creativity:
- Create, perform, or think in different and diverse ways about the same objects or scenarios.
 - Deal with problems and situations that do not have simple solutions.
 - Innovate and perform tasks in a better manner.
 - View a problem or a situation from multiple perspectives.
 - Think 'out of the box' and generate solutions to complex problems in unfamiliar contexts.
 - Adopt innovative, imaginative, lateral thinking, interpersonal skills and emotional intelligence.
- PO4:** Communication Skills:
- Listen carefully, read texts and research papers analytically and present complex information in a clear and concise manner to different groups / audiences.
 - Express thoughts and ideas effectively in writing and orally and communicate with others using appropriate media.
 - Confidently share views and express herself / himself.
 - Construct logical arguments using correct technical language related to a field of learning, work/vocation, or an area of professional practice, and convey ideas, thoughts, and arguments using language that is respectful and sensitive to gender and other minority groups.
- PO5:** Analytical reasoning/thinking:
- Evaluate the reliability and relevance of evidence.
 - Identify logical flaws in the arguments of others.
 - Analyze and synthesize data from a variety of sources-draw valid conclusions and support them with evidence and examples, and address opposing viewpoints.
- PO6:** Research-related skills:
- A keen sense of observation, inquiry, and capability for asking relevant/ appropriate questions.
 - The ability to problematize, synthesize, and articulate issues and design research proposals.
 - The ability to define problems, formulate appropriate and relevant research questions, formulate hypotheses, test hypotheses using quantitative and qualitative data, establish hypotheses, make inferences based on the analysis and interpretation of data, and predict cause-and-effect relationships.
 - The capacity to develop appropriate methodology and tools for data collection.
 - The appropriate use of statistical and other analytical tools and techniques.

- The ability to plan, execute and report the results of an experiment or investigation, the ability to acquire the understanding of basic research ethics and skills in practicing/doing ethics in the field/ in personal research work, regardless of the funding authority or field of study.
- PO7:** Coordinating/collaborating with others:
- Work effectively and respectfully with diverse teams.
 - Facilitate cooperative or coordinated effort on the part of a group.
 - Act together as a group or a team in the interests of a common cause and work efficiently as a member of a team.
- PO8:** Leadership readiness/qualities:
- Mapping out the tasks of a team or an organization and setting direction.
 - Formulating an inspiring vision and building a team that can help achieve the vision, motivating and inspiring team members to engage with that vision.
 - Using management skills to guide people to the right destination.
- PO9:** Learning how to learn skills:
- Acquire new knowledge and skills, including 'learning how to learn skills, that are necessary for pursuing learning activities throughout life, through self-paced and self-directed learning aimed at personal development, meeting economic, social, and cultural objectives, and adapting to changing trades and demands of the workplace, including adapting to the changes in work processes in the context of the fourth industrial revolution, through knowledge / skill development / re-skilling.
 - Work independently; identify appropriate resources required for further learning.
 - Acquire organizational skills and time management to set self-defined goals and targets with timelines.
 - Inculcate a healthy attitude to be a lifelong learner.
- PO10:** Digital and technological skills:
- Use ICT in a variety of learning and work situations.
 - Access, evaluate, and use a variety of relevant information sources, and use appropriate software for analysis of data.
- PO11:** Multicultural competence and inclusive spirit:
- The acquisition of knowledge of the values and beliefs of multiple cultures and a global perspective to honour diversity.
 - Capability to effectively engage in a multicultural group/society and interact respectfully with diverse groups.
 - Capability to lead a diverse team to accomplish common group tasks and goals.
 - Gender sensitivity and adopting a gender-neutral approach, as also empathy for the less advantaged and the differently-abled including those with learning disabilities.
- PO12:** Value inculcation:
- Embrace and practice constitutional, humanistic, ethical, and moral values in life, including universal human values of truth, righteous conduct, peace, love, non-violence, scientific temper, citizenship values.
 - Practice responsible global citizenship required for responding to contemporary global challenges, enabling learners to become aware of and understand global issues and to become active promoters of more peaceful, tolerant, inclusive, secure, and sustainable societies.
 - Formulate a position/argument about an ethical issue from multiple perspectives.
 - Identify ethical issues related to work, and follow ethical practices, including avoiding unethical behavior such as fabrication, falsification or misrepresentation of data, or committing plagiarism, and adhering to intellectual property rights.
 - Recognize environmental and sustainability issues and participate in actions to promote sustainable development.
 - Adopt an objective, unbiased, and truthful actions in all aspects of work.
 - Instill integrity and identify ethical issues related to work, and follow ethical practices.

- PO13:** Autonomy, responsibility, and accountability:
- Apply knowledge, understanding, and/or skills with an appropriate degree of independence relevant to the level of the qualification.
 - Work independently, identify appropriate resources required for a project, and manage a project through to completion.
 - Exercise responsibility and demonstrate accountability in applying knowledge and/or skills in work and/or learning contexts appropriate for the level of the qualification, including ensuring safety and security at workplaces.
- PO14:** Environmental awareness and action:
- Ability to apply the knowledge, skills, attitudes, and values required to take appropriate actions for.
 - Mitigating the effects of environmental degradation, climate change, and pollution.
 - Effective waste management, conservation of biological diversity, management of biological resources and biodiversity, forest and wildlife conservation, and sustainable development and living.
- PO15:** Community engagement and service:
- To participate in community-engaged services/ activities for promoting the wellbeing of society.
- PO16:** Empathy:
- To identify with or understand the perspective, experiences, or points of view of another individual or group, and to identify and understand other people's emotions.
- PSO1:** **Statistical Proficiency:** Build a strong foundation in statistical principles, theories, and techniques, including differential calculus, descriptive statistics, probability, statistical methods, and inference for analyzing and interpreting complex data.
- PSO2:** **Statistical Thinking and Problem-Solving Skills:** Cultivate critical thinking skills and the ability to approach problems from a statistical perspective and develop problem-solving strategies and ability to formulate appropriate statistical questions and hypotheses.
- PSO3:** **Data Analysis, Visualization, and Statistical Modeling:** Develop expertise in statistical software tools for data analysis, visualization, modeling, and inference. Apply these techniques to effectively analyze and interpret data, make accurate predictions, and gain meaningful insights across domains.
- PSO4:** **Application of Advanced Statistical Models in Machine Learning:** Apply advanced statistical models in machine learning to solve real-world problems across various domains. Utilize techniques such as quality control, decision theory, optimization, and multivariate analysis to apply statistical methodologies effectively.

Curriculum Structure
(Flexible Credit System)

Minimum Credit Requirements to Award Degree Under Each Category

| S.No. | Course Category and Category Code | | Minimum Credit Requirement | | | | | |
|--------------|---|------|----------------------------|------------|------------------------------|------------|--|------------|
| | | | 3 Year Undergraduate | | 4 Year Undergraduate (Hons.) | | 4 Year Undergraduate (Hons.) with Research | |
| | | | Credits | (%) | Credits | (%) | Credits | (%) |
| 1 | Multidisciplinary Core Courses | MDC | 12 | 10 | 12 | 7.5 | 12 | 7.5 |
| 2 | Major Core | MC | 45 | 37.50 | 77 | 48.13 | 65 | 40.63 |
| 3 | Major Electives | ME | 15 | 12.50 | 15 | 09.37 | 15 | 09.37 |
| 4 | Minor | MI | 24 | 20 | 32 | 20 | 32 | 20 |
| 5 | Internship | INT | 04 | 3.40 | 04 | 2.50 | 04 | 2.50 |
| 6 | Ability Enhancement Courses – University Core | UC | 08 | 6.60 | 08 | 05 | 08 | 05 |
| 7 | Skill Enhancement Courses – University Core | UC | 08 | 6.60 | 08 | 05 | 08 | 05 |
| 8 | Value Added Courses – University Core | UC | 04 | 3.40 | 04 | 2.50 | 04 | 2.50 |
| 9 | Research Project / Dissertation | PROJ | -- | 00 | -- | 00 | 12 | 7.50 |
| Total | | | 120 | 100 | 160 | 100 | 160 | 100 |

Multi-disciplinary Core Courses (MDC): 12 credits

| Course Code | Level | Course Title | L | T | P | S | J | C |
|--|-------|--|---|---|---|---|---|-----------|
| Basket - Business (Minimum 4 credits) | | | | | | | | |
| HRMG1012 | 100 | Principles of Management | 2 | 0 | 0 | 0 | 0 | 2 |
| IENT1061 | 100 | Introduction to Business Environment | 2 | 0 | 0 | 0 | 0 | 2 |
| INFS1011 | 100 | Technology and Business | 2 | 0 | 0 | 0 | 0 | 2 |
| STGM1011 | 100 | Introduction to Business Organization | 2 | 0 | 0 | 0 | 0 | 2 |
| Basket - Humanities and Social Sciences (Minimum 4 Credits) | | | | | | | | |
| SOCY1071 | 100 | Introduction to the Humanities | 2 | 0 | 0 | 0 | 0 | 2 |
| SOCY1081 | 100 | Foundations of Social Sciences | 2 | 0 | 0 | 0 | 0 | 2 |
| MSTU1081 | 100 | Media and Communication (Offered in Hyderabad Campus alone) | 2 | 0 | 0 | 0 | 0 | 2 |
| FPEA1221 | 100 | Performing Arts in Indian Cinema | 2 | 0 | 0 | 0 | 0 | 2 |
| LANG1261 | 100 | The Art of Storytelling | 2 | 0 | 0 | 0 | 0 | 2 |
| Basket - Science (Minimum 4 Credits) | | | | | | | | |
| PHYS1371 | 100 | Introduction to Astronomy and Astrophysics | 2 | 0 | 0 | 0 | 0 | 2 |
| LFSC1001 | 100 | Essentials of Life Processes | 2 | 0 | 0 | 0 | 0 | 2 |
| LFSC1011 | 100 | Fundamentals of Natural and Chemical Sciences | 2 | 0 | 0 | 0 | 0 | 2 |
| MATH1371 | 100 | Conceptual Mathematics | 2 | 0 | 0 | 0 | 0 | 2 |
| CSCI1341 | 100 | Fundamentals of Computer Science | 2 | 0 | 0 | 0 | 0 | 2 |
| Total Credits | | | | | | | | 12 |

Major Core (MC): 45 credits

| Course Code | Level | Course Title | L | T | P | S | J | C |
|----------------------|-------|--|---|---|---|---|---|-----------|
| MATH1321 | 100 | Probability-I | 3 | 0 | 0 | 0 | 0 | 3 |
| MATH1331 | 100 | Real Analysis | 3 | 0 | 0 | 0 | 0 | 3 |
| MATH2431 | 200 | Demography | 3 | 0 | 0 | 0 | 0 | 3 |
| MATH2461 | 200 | Linear Algebra and Matrices -I | 3 | 0 | 0 | 0 | 0 | 3 |
| MATH2471 | 200 | Linear algebra and Matrices -II | 3 | 0 | 0 | 0 | 0 | 3 |
| MATH2491 | 200 | Probability-II | 2 | 1 | 0 | 0 | 0 | 3 |
| MATH2501 | 200 | Probability-III (Stochastic Process) | 3 | 0 | 0 | 0 | 0 | 3 |
| MATH2531 | 200 | Statistical Methods-I | 2 | 0 | 2 | 0 | 0 | 3 |
| MATH2541 | 200 | Statistical Methods-II | 2 | 0 | 2 | 0 | 0 | 3 |
| MATH3241 | 300 | Design of Experiments | 2 | 0 | 2 | 0 | 0 | 3 |
| MATH3291 | 300 | Inference - I | 3 | 0 | 0 | 0 | 0 | 3 |
| MATH3331 | 300 | Linear Models | 2 | 0 | 2 | 0 | 0 | 3 |
| MATH3431 | 300 | Statistical Methods-III | 2 | 0 | 2 | 0 | 0 | 3 |
| MATH3301 | 300 | Inference - II | 2 | 0 | 2 | 0 | 0 | 3 |
| MATH3411 | 300 | Sample Surveys | 2 | 0 | 2 | 0 | 0 | 3 |
| Total Credits | | | | | | | | 45 |

Major Electives (ME): 15 credits

Minimum number of credits to be earned: 15.

| Course Code | Level | Course Title | L | T | P | S | J | C |
|--------------------------------------|-------|---|---|---|---|---|---|---|
| (Any one course to be chosen) | | | | | | | | |
| MATH2102 | 200 | Introduction to Optimization Methods | 2 | 0 | 2 | 0 | 0 | 3 |
| MATH2481 | 200 | Operations Research -I | 2 | 0 | 2 | 0 | 0 | 3 |
| (Any one course to be chosen) | | | | | | | | |
| MATH3271 | 300 | Index numbers & Time series | 2 | 0 | 2 | 0 | 0 | 3 |
| MATH3441 | 300 | Statistical Quality Control | 2 | 0 | 2 | 0 | 0 | 3 |
| (Any one course to be chosen) | | | | | | | | |
| MATH3042 | 300 | Discrete Mathematics | 3 | 0 | 0 | 0 | 0 | 3 |
| MATH3231 | 300 | Data Structure | 3 | 0 | 0 | 0 | 0 | 3 |
| (Any one course to be chosen) | | | | | | | | |
| MATH3281 | 300 | Indian Official Statistics | 3 | 0 | 0 | 0 | 0 | 3 |
| MATH3201 | 300 | Actuarial Statistics | 2 | 0 | 2 | 0 | 0 | 3 |
| (Any one course to be chosen) | | | | | | | | |
| MATH3261 | 300 | Epidemiology | 3 | 0 | 0 | 0 | 0 | 3 |
| MATH3391 | 300 | Psychology and Educational Statistics | 2 | 0 | 2 | 0 | 0 | 3 |

Internship (INT): 4 credits

| Course code | Level | Course Title | L | T | P | S | J | C |
|-------------|-------|--------------|---|---|---|---|---|---|
| INTN3444 | 300 | Internship | 0 | 0 | 0 | 0 | 8 | 4 |

University Core (UC): 20 credits

| Course code | Level | Course Title | L | T | P | S | J | C |
|--|-------|---|---|---|---|---|---|---|
| Ability Enhancement Courses | | | | | | | | |
| LANG1042 | 100 | Academic Writing | 2 | 0 | 0 | 0 | 0 | 2 |
| LANG1201 | 100 | Critical Thinking | 2 | 0 | 0 | 0 | 0 | 2 |
| IENT1051 | 100 | Fundamentals of Entrepreneurship | 2 | 0 | 0 | 0 | 0 | 2 |
| LANG1241 | 100 | Communicative English - I | 0 | 0 | 4 | 0 | 0 | 2 |
| LANG1251 | 100 | Communicative English - II | 0 | 0 | 4 | 0 | 0 | 2 |
| Skill Enhancement Courses | | | | | | | | |
| CSCI1302 | 100 | Introduction to Programming | 0 | 0 | 4 | 0 | 0 | 2 |
| CSCI1312 | 100 | Introduction to Data Science | 0 | 0 | 4 | 0 | 0 | 2 |
| CLAD1041 | 100 | Art of Persuasive Communication | 0 | 0 | 2 | 0 | 0 | 1 |
| CLAD1051 | 100 | Competence in Communication | 0 | 0 | 2 | 0 | 0 | 1 |
| CLAD1061 | 100 | Life Skills | 0 | 0 | 2 | 0 | 0 | 1 |
| CLADXXXX | 100 | Soft Skills - 4 | 0 | 0 | 2 | 0 | 0 | 1 |
| Value Added Courses | | | | | | | | |
| ENVS1003 | 100 | Environmental Studies | 3 | 0 | 0 | 0 | 0 | 3 |
| POLS1051 | 100 | The Indian Constitution * | 1 | 0 | 0 | 0 | 0 | 1 |
| Pass / Fail Courses (Mandatory) | | | | | | | | |
| FINA1081 | 100 | Personal Financial Planning * | 1 | 0 | 0 | 0 | 0 | 1 |
| PHPY1011 | 100 | Gandhi and the Contemporary World * / UHV | 1 | 0 | 0 | 0 | 0 | 1 |
| Pass / Fail Courses (Any one course to be chosen) | | | | | | | | |
| DOSP1181 | 100 | Yogasana | 0 | 0 | 0 | 2 | 0 | 1 |
| MFST1002 | 100 | Health and Wellbeing * | 0 | 0 | 2 | 0 | 0 | 1 |
| DOSL1081 | 100 | Student Life Activities (Participant) | 0 | 0 | 0 | 2 | 0 | 1 |
| DOSL1091 | 100 | Student Life Activities (Organizer) | 0 | 0 | 0 | 2 | 0 | 1 |
| DOSL1101 | 100 | Student Life Activities (Competitor) | 0 | 0 | 0 | 2 | 0 | 1 |
| DOSL1111 | 100 | Foundations of Student (Leadership) | 0 | 0 | 0 | 2 | 0 | 1 |
| DOSL1042 | 100 | Community Services – Volunteer | 0 | 0 | 2 | 0 | 0 | 1 |
| DOSL1052 | 100 | Community Services – Mobilizer | 0 | 0 | 2 | 0 | 0 | 1 |
| DOSP1003 | 100 | Badminton | 0 | 0 | 0 | 2 | 0 | 1 |
| DOSP1033 | 100 | Football | 0 | 0 | 0 | 2 | 0 | 1 |
| DOSP1043 | 100 | Volleyball | 0 | 0 | 0 | 2 | 0 | 1 |
| DOSP1053 | 100 | Kabaddi | 0 | 0 | 0 | 2 | 0 | 1 |
| DOSP1073 | 100 | Table Tennis | 0 | 0 | 0 | 2 | 0 | 1 |
| DOSP1083 | 100 | Handball | 0 | 0 | 0 | 2 | 0 | 1 |
| DOSP1093 | 100 | Basketball | 0 | 0 | 0 | 2 | 0 | 1 |
| DOSP1113 | 100 | Throw ball | 0 | 0 | 0 | 2 | 0 | 1 |
| DOSP1142 | 100 | Cricket | 0 | 0 | 0 | 2 | 0 | 1 |
| DOSP1132 | 100 | Functional Fitness | 0 | 0 | 0 | 2 | 0 | 1 |
| DOSP1171 | 100 | Martial Arts/Self Defence | 0 | 0 | 0 | 2 | 0 | 1 |

* Massive Open Online Course (MOOC)

Students pursuing 4th year of the Programme need to choose the courses from the respective basket of Honours or Honours with Research

Honours Courses

Minimum number of credits to be earned: 32.

| Course Code | Level | Course Title | L | T | P | S | J | C |
|---|-------|--|---|---|---|---|---|---|
| Any Eight of the following courses | | | | | | | | |
| MATH4011 | 400 | Advanced Data Analysis | 3 | 0 | 2 | 0 | 0 | 4 |
| MATH4021 | 400 | Advanced Data Visualization | 3 | 0 | 2 | 0 | 0 | 4 |
| MATH4091 | 400 | Applied Multivariate Statistics | 3 | 0 | 2 | 0 | 0 | 4 |
| MATH4101 | 400 | Artificial Intelligence | 4 | 0 | 0 | 0 | 0 | 4 |
| MATH4111 | 400 | Bayesian Inference | 3 | 0 | 2 | 0 | 0 | 4 |
| MATH4131 | 400 | Data base management system | 3 | 0 | 2 | 0 | 0 | 4 |
| MATH4141 | 400 | Design of Algorithm | 4 | 0 | 0 | 0 | 0 | 4 |
| MATH4151 | 400 | Design of Experiments-II | 3 | 0 | 2 | 0 | 0 | 4 |
| MATH4161 | 400 | Econometrics | 3 | 0 | 2 | 0 | 0 | 4 |
| MATH4231 | 400 | Measure Theory | 4 | 0 | 0 | 0 | 0 | 4 |
| MATH4241 | 400 | Modeling and Simulation | 3 | 0 | 2 | 0 | 0 | 4 |
| MATH4251 | 400 | Nature Inspired computing | 3 | 0 | 2 | 0 | 0 | 4 |
| MATH4261 | 400 | Operation Research -II | 3 | 0 | 2 | 0 | 0 | 4 |
| MATH4281 | 400 | Reliability theory | 3 | 0 | 2 | 0 | 0 | 4 |
| MATH4291 | 400 | Statistical Learning | 3 | 0 | 2 | 0 | 0 | 4 |
| MATH4311 | 400 | Survival Analysis | 3 | 0 | 2 | 0 | 0 | 4 |
| MATH4321 | 400 | Text Analytics: Statistical Approach | 3 | 0 | 2 | 0 | 0 | 4 |
| MATH4331 | 400 | Time series analysis | 3 | 0 | 2 | 0 | 0 | 4 |

Honours with Research Courses

Minimum number of credits to be earned is 32 out of which 12 credits must be earned through Research Project / Dissertation

| Course Code | Level | Course Title | L | T | P | S | J | C |
|--|-------|--|---|---|---|---|---|---|
| Any Five of the following courses | | | | | | | | |
| MATH4011 | 400 | Advanced Data Analysis | 3 | 0 | 2 | 0 | 0 | 4 |
| MATH4021 | 400 | Advanced Data Visualization | 3 | 0 | 2 | 0 | 0 | 4 |
| MATH4091 | 400 | Applied Multivariate Statistics | 3 | 0 | 2 | 0 | 0 | 4 |
| MATH4101 | 400 | Artificial Intelligence | 4 | 0 | 0 | 0 | 0 | 4 |
| MATH4111 | 400 | Bayesian Inference | 3 | 0 | 2 | 0 | 0 | 4 |
| MATH4131 | 400 | Data base management system | 3 | 0 | 2 | 0 | 0 | 4 |
| MATH4141 | 400 | Design of Algorithm | 4 | 0 | 0 | 0 | 0 | 4 |
| MATH4151 | 400 | Design of Experiments-II | 3 | 0 | 2 | 0 | 0 | 4 |
| MATH4161 | 400 | Econometrics | 3 | 0 | 2 | 0 | 0 | 4 |
| MATH4231 | 400 | Measure Theory | 4 | 0 | 0 | 0 | 0 | 4 |
| MATH4241 | 400 | Modeling and Simulation | 3 | 0 | 2 | 0 | 0 | 4 |
| MATH4251 | 400 | Nature Inspired computing | 3 | 0 | 2 | 0 | 0 | 4 |
| MATH4261 | 400 | Operation Research -II | 3 | 0 | 2 | 0 | 0 | 4 |
| MATH4281 | 400 | Reliability theory | 3 | 0 | 2 | 0 | 0 | 4 |
| MATH4291 | 400 | Statistical Learning | 3 | 0 | 2 | 0 | 0 | 4 |
| MATH4311 | 400 | Survival Analysis | 3 | 0 | 2 | 0 | 0 | 4 |
| MATH4321 | 400 | Text Analytics: Statistical Approach | 3 | 0 | 2 | 0 | 0 | 4 |
| MATH4331 | 400 | Time series analysis | 3 | 0 | 2 | 0 | 0 | 4 |

| Research Project / Dissertation (PROJ) | | | | | | | | |
|--|-----|---|---|---|---|---|----|---|
| DIST4888 | 400 | Dissertation - I (Review of Literature & Research Proposal) | 0 | 0 | 0 | 0 | 8 | 4 |
| DIST4999 | 400 | Dissertation – II | 0 | 0 | 0 | 0 | 16 | 8 |

Minor Courses

One Minor is to be chosen from the following list of Minors.

The minimum number of credits to be earned up to 3 years of the programme is 24.

The minimum number of credits to be earned for the 4 year programme is 32.

Minors List

| S.No. | Minor | Offered by School | Credits Required | |
|-------|--|-------------------|------------------|-----------|
| | | | 3-Year UG | 4-Year UG |
| 1 | Business Analytics (Except for GSB) | Business | 24 | 32 |
| 2 | Business Management (Except for GSB) | Business | 24 | 32 |
| 3 | Financial Markets (Except for GSB) | Business | 24 | 32 |
| 4 | Psychology | Humanities | 24 | 32 |
| 5 | Economics | Humanities | 24 | 32 |
| 6 | English | Humanities | 24 | 32 |
| 7 | Bharatanatyam | Humanities | 24 | 32 |
| 8 | Carnatic Vocal | Humanities | 24 | 32 |
| 9 | Choreography and Screen Dance | Humanities | 24 | 32 |
| 10 | Kuchipudi | Humanities | 24 | 32 |
| 11 | Mohiniyattam | Humanities | 24 | 32 |
| 12 | Mridangam | Humanities | 24 | 32 |
| 13 | Theatre Arts | Humanities | 24 | 32 |
| 14 | Visual Arts | Humanities | 24 | 32 |
| 15 | History | Humanities | 24 | 32 |
| 16 | Mass communication (Hyd) | Humanities | 24 | 32 |
| 17 | Visual Communication (Hyd) | Humanities | 24 | 32 |
| 18 | Sociology | Humanities | 24 | 32 |
| 19 | Political Science | Humanities | 24 | 32 |
| 20 | Public Policy (Hyd) | Public Policy | 24 | 32 |
| 21 | Chemistry | Science | 24 | 32 |
| 22 | Data Science | Science | 24 | 32 |
| 23 | Biochemistry | Science | 24 | 32 |
| 24 | Bioinformatics | Science | 24 | 32 |
| 25 | Biotechnology | Science | 24 | 32 |
| 26 | Environmental Management | Science | 24 | 32 |
| 27 | Environmental Science | Science | 24 | 32 |
| 28 | Microbiology | Science | 24 | 32 |
| 29 | Food Science and Technology | Science | 24 | 32 |
| 30 | Mathematics | Science | 24 | 32 |
| 31 | Statistics | Science | 24 | 32 |
| 32 | Atmospheric Physics | Science | 24 | 32 |
| 33 | Climate Science | Science | 24 | 32 |
| 34 | Electronics | Science | 24 | 32 |
| 35 | Physics | Science | 24 | 32 |
| 36 | Quantum Computing | Science | 24 | 32 |
| 37 | Computer Science | Technology | 24 | 32 |
| 38 | Data Analytics | Technology | 24 | 32 |
| 39 | Machine Learning | Technology | 24 | 32 |



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