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UNIVERSITY OF MYSORE

Estd.1916

Vishwavidyanilaya Karyasoudha
Crawford Hall, Mysuru- 570 005

(Re-accredited by NAAC at 'A')
(NIRF-2023 Ranked 44 in University Category & 71 in Overall Category)

No.: PMEB-1/Spl./10/2023-24 **Date: 06-01-2024**

NOTIFICATION

Sub.: Syllabus and Examination pattern of **B.Sc. (Hons.)(Artificial Intelligence and Machine Learning)** course under Specialized Programmes from the academic year 2023-24-reg.

Ref.: 1. Decision of the BOS Meeting held on 26-05-2023.
2. Decision of the Academic Council meeting held on 10-11-2023.

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The Board of Studies in **B.Sc. (Hons.) (Artificial Intelligence and Machine Learning) (UG)** at its meeting held on 26-05-2023 has recommended to approve the scheme of examination and the syllabus of **B.Sc. (Hons.) (Artificial Intelligence and Machine Learning)** course in University of Mysore under specialized/specified programs from the academic year 2023-24 as per NEP-2020.

The Academic Council has also approved the above said proposals at its meeting held on 10-11-2023 and the same is hereby notified.

The syllabus of **B.Sc. (Hons.) (Artificial Intelligence and Machine Learning)** course may be downloaded from the University website **https://uni-mysore.ac.in/PMEB/.**

REGISTRAR
REGISTRAR
University of Mysore
MYSURU - 570 005

To,

1. The Registrar (Evaluation), University of Mysore, Mysuru.
2. The Dean, Faculty of Science & Technology, DoS in Mathematics, Manasagangothri, Mysuru.
3. Prof. Suresha, DoS in Computer Science, Manasagangothri, Mysuru.
4. The Principal, Marian Institute of Professional Studies (MIPS), MIT Campus, Belawadi, Srirangapatna Tq., Mandya Dist.
5. The Deputy Registrar/ Asst. Registrar/ Superintendent, Examination Branch, UOM, Mysuru.
6. The PA to Vice-Chancellor/Registrar/Registrar (Evaluation), University of Mysore, Mysuru.
7. Office Copy.

COURSE STRUCTURE – B.Sc. (Artificial Intelligence and Machine Learning)

SEMESTER	CORE - DSCC		ELECTIVE				ABILITY ENHANCEMENT COURSES				TOTAL CREDIT
			DSE		OE		SEC/ VB		AECC		
	COURSE	CREDIT	COURSE	CREDIT	COURSE	CREDIT	COURSE	CREDIT	COURSE	CREDIT	
SEM I	DSCC 1 DSCC 2 DSCC 3	4 3 3			OEC 1	3	SEC 1 VBC 1	2 1	AECC 1 AECC 2 AECC 3	3 3 2	**24**
SEM II	DSCC 4 DSCC 5 DSCC 6	4 3 3			OEC 2	3	SEC 2 VBC 2	2 1	AECC 4 AECC 5 AECC 6	3 3 2	**24**

DSCC: Discipline Specified Core Courses
DSEC: Discipline Specified Elective Courses
OEC: Open Elective Courses

SEC: Skill Enhancement Course, VBC= Value Based Courses
AECC: Ability Enhancement Compulsory Courses

UNIVERSITY OF MYSORE

B.Sc-Hons (Artificial Intelligence and Machine Learning)

SYLLABUS

NEP 2020

IMPLEMENTED FROM THE

ACADEMIC YEAR 2023-24

SYLLABUS FOR B.Sc-Hons(Artificial Intelligence and Machine Learning) DEGREE AS PER NEP – 2020 REGULATIONS IMPLEMENTED FROM THE ACADEMIC YEAR 2023-24

I. OBJECTIVES:

a. To familiarize the students with various approaches, methods and techniques of Animation Technology.
b. To Apply analytical and critical thinking to identify, formulate, analyse, and solve complex problems in order to reach authenticated conclusions.
c. To Apply the technical and critical thinking skills in the discipline of artificial intelligence and machine learning to find solutions for complex problems.
d. To Understand what the latest generation of Artificial Intelligence can do with the decision-making process and accrue the qualities of a good leader.
e. To determine the problems where artificial intelligence techniques are applicable.
f. To enable students to participate in the design of systems that act intelligently and learn from experience.
g. To provide efficient and re-defined workforce that enables less manual and paper work, quick responses, change of public administration, provide better solutions
h. To develop expertise in Design and develop research-based solutions for complex problems in artificial intelligence and machine learning industry through appropriate consideration for the public health, safety, cultural, societal, and environmental concerns.

Preamble

Education is crucial in the formation of a nation. In our country, there are numerous educational institutions that provide guidance and training to impart quality education. However, our current educational system produces youth who must compete locally, regionally, nationally, and globally. The twenty-first century has brought many new challenges to the field of higher education. The current perilous situation necessitates system transformation and/or redesign, not only by introducing innovations but also by developing a "learner-centric" approach. However, the majority of our higher education institutions have followed a system that restricts students' ability to study subjects/courses. It should be comprehensive in order to develop the student into an ideal human being and useful person in society. Higher education's goal is to develop good, well-rounded, and creative individuals. It must allow an individual to study one or more specialised areas of interest in greater depth, while also developing character, ethical and constitutional values, intellectual curiosity, a spirit of service, and capabilities across disciplines such as sciences, social sciences, arts, humanities, and professional, technical, and vocational crafts.

The National Education Policy (NEP) has introduced several reforms in Indian education, including broad-based multidisciplinary Undergraduate Education with 21st Century skills and the development of specialised knowledge with disciplinary intellectual rigour. Its goal is to improve the National Higher Education System's equity, efficiency, and academic excellence. The most important ones are course curriculum innovation and improvement, paradigm shifts in learning and teaching pedagogy, evaluation, and education system.

Hence the University of Mysore thought it fit to implement the multidisciplinary and holistic education in all the under-graduate programs and the consequential post-graduate programs, with multiple entry and exit options with multiple certificate/diploma/degrees in the Faculties of Arts, Science, Commerce and Management to replace the present undergraduate degree programs effective from the academicyear2021-22.So based on the initiative of MHRD, the Marian Institute of Professional Studies (MIPS) run by Godwins Institution Private Ltd, has decided to follow the Multi-Disciplinary Under graduate Program with multiple exit and entry options with certificate/Diploma/degrees at each of the existing programs. Undergraduate courses should emphasise creativity and innovation, critical thinking and higher order thinking skills, problem solving abilities, teamwork, communication skills, more in-depth learning, and mastery of curriculum content across fields.

The proposed four-year multidisciplinary undergraduate programme is a fundamental transformation of current undergraduate education that replaces the traditional undergraduate programmes of the state's universities while also attempting to empower students and assist them in their pursuit of overall excellence. Students will be able to graduate after one year with a certificate, two years with a diploma, and three years with a bachelor's degree. The completion of the four-year programme will result in the

award of a bachelor's degree with honors in specific subjects. In colleges, continuation of the undergraduate programme for the fourth year is optional in subjects however, it is the preferred option.

Salient Features of four-year multidisciplinary undergraduate programme

- The program shall be structured in a semester mode with multiple exit options with Certification, Diploma and Basic Bachelor Degree at the completion of first, second and third years, respectively. The candidate who completes the four years Undergraduate Program, either in one stretch or through multiple exits and re-entries would get a Bachelor's degree with Honors.
- The four years undergraduate Honors degree holders with research component and a suitable grade are eligible to enter the 'Doctoral (Ph.D.) Program' in a relevant discipline or to enter 'Two Semester Master's Degree programme with project work'.
- Candidates who wish to enter the master's/doctoral programme in a discipline other than the major discipline studied at the undergraduate programmes, have to take additional courses in the new discipline to meet the requirement or to make up the gap between the requirement and the courses already studied.
- There may be parallel five-year integrated master's degree programmes with exit options at the completion of third and fourth years, with the undergraduate degree andundergraduate degree with honours in a discipline, respectively.
- There may also be an integrated doctoral programme with exit option at the end of thefirst year with the Master's degree
- The students who exit with Certification, Diploma and Basic Bachelor Degree shall be eligible to re-enter the programme at the exit level to complete the programme or to complete the next level.
- The curriculum combines conceptual knowledge with practical engagement and understanding that has relevant real-world application through practical laboratory work, field work, internships, workshops and research projects.

The Four-Year Choice Based Credit System Semester Scheme makes the product of a university at par with the global practices in terms of academic standards and evaluation strategies. In the emerging scenario of Internationalization of Indian Higher Education, it is imperative that the Universities in India should follow this system so that the mobility of theirproducts both within and across the geographical jurisdiction becomes possible.

2. NAME OF THE PROGRAMME

2.1 The name of the programme is **B.Sc. (Artificial Intelligence and Machine Learning)**

2.2 The following Regulations are applicable to all the students who are taking admission for the first semester from 2023-24 Academic year as per the NEP Regulations 2020.

2.3 The duration of each semester is extended over a period of 16 weeks (90 working days) except training period (twenty-two weeks). The total duration of a semester is twenty weeks inclusive of semester end examination

3.ELIGIBILITY FOR ADMISSION

Candidates who have passed the Two-Year Pre-University Course of Karnataka State in in science stream any discipline with mathematics at plus two level or its equivalent (viz., 10+2/HSE of other state or central government boards, CBSE, ICSE, NIOS etc.) are eligible for admission into this program.

4. LATERAL ENTRY

4.1 The students who has passed one year – Computer Application/ Artificial Intelligence Diploma/Certificate programmes in Computer Application/ Artificial Intelligence /Skill Enhancement programmes in Computer Application/ Artificial Intelligence of Recognized bodies (Regular/Distance/Open University mode) after Plus two /PUC /Equivalent will be allowed admission to the third semester B.Sc. (Artificial Intelligence and Machine Learning).

4.2 The students who has passed Two year – Computer Application/ Artificial Intelligence Diploma/Certificate programmes in Computer Application/ Artificial Intelligence /Skill Enhancement programmes in Computer Application/ Artificial Intelligence of Recognized bodies (Regular/Distance/Open University mode) after Plus two /PUC /Equivalent will be allowed admission to the fifth semester B.Sc. (Artificial Intelligence and Machine Learning).

4.3 All compulsory subjects (Languages, Environmental studies, Constitution of India etc.) as required by UGC should be successfully completed in a bridge course if the student has not undergone the prescribed subjects in the diploma/Certificate Course.

5. FEATURES OF CHOICE BASED CREDIT SYSTEM SCHEME

Each course shall carry certain number of credits. Credits normally represent the weightage of a course and are a function of teaching, learning and evaluation strategies such as the number of contact hours, the course content, teaching methodology, learning expectations, maximum marks etc. In the proposed programs, generally one hour of instructions per week in a semester is assigned one credit. In terms of evaluation, one credit is generally equivalent to 25 marks in a semester. Thus a 3 or 4 credits course will be assessed for 100 marks, 2 credits courses are assessed for 50 marks and one credit course will be assessed for 25 marks. What matters for the calculation of Semester Grade Point Average (SGPA) or the Cumulative Grade Point Average (CGPA) is the percentage of marks secured in a course and the credits assigned to that course.

On this basis, generally, a three-year (six-semester) undergraduate program will have around 140 credits, and a four-year (eight-semester) honors degree program will have

around 180 credits and a five-year (ten semester) master's degree programme will have 220 credits.

5.1 DURATION OF PROGRAMMES, CREDITS REQIUREMENTS AND OPTIONS

The undergraduate degree should be of either a three- or four-year duration, with multiple entry and exit options within this period, The four years multi-disciplinary Bachelor's programme is the preferred option as it allows the opportunity to experience the full range of holistic and multi-disciplinary education with a focus on major and minor subjects as per the student's preference. The four-year programme may also lead to a degree with Research, if the student completes a rigorous research project in the major area(s) of study

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The undergraduate programmes shall extend over four academic years (Eight Semesters) with multiple entry and exit options. The students can exit after the completion of one academic year (Two semesters) with the Certificate in a discipline or a field; Diploma after the study of two academic years (Four Semesters) and Regular Bachelor Degree after the completion of three academic years (Six Semesters). The successful completion of Four Years undergraduate Programme would lead to Bachelor Degrees with Honours in a discipline/subject. Each semester shall consist of at least 16 weeks of study with a minimum of 90 working days (excluding the time spent for the conduct of final examination of each semester).

The candidates shall complete the courses equivalent to minimum credit requirements

Exit with	Min. Credits Requirement*	NSQF Level
Certificate at the Successful Completion of First Year (Two Semesters) of Four Years Multidisciplinary UG Degree Programme	48	5
A Diploma at the Successful Completion of the Second Year (Four Semesters) of Four Years Multidisciplinary UG Degree Programme	96	6
Basic Bachelor Degree at the Successful Completion of the Third Year (Six Semesters) of Four Years Multidisciplinary Undergraduate Degree Programme	140	7
Bachelor Degree with Honors in a **Discipline** at the Successful Completion of the Four Years(Eight Semesters) Multidisciplinary Undergraduate Degree Programme	180	8

Master's Degree Programmes will be of One Academic Year (Two Semesters) for the Four Years Honours Degree holders and it will be of Two Academic Years (Four Semesters) for the three years basic or three years Bachelor's Degree holders.

Two Years Master's Degree Programmes will have exit option at the end of One Academic Year (Two Semesters) with the Post-graduate Diplomas in the respective disciplines/ subjects, provided they complete courses equal to a minimum of 44 credits:

44 Credits after the Bachelor Degree to become eligible for the PG Diploma

88 Credits after the Bachelor Degree to become eligible for the Masters Degree

It is optional to the candidate to exit or not, after two, four and six semesters of the undergraduate programme with Certificate, Diploma and with Regular Bachelor Degree, respectively. He/she will be eligible to rejoin the programme at the exit level to complete either the diploma, degree or the honors degree. Further, all the candidates will be awarded Bachelor degrees on successful completion of three academic years (Six Semesters) of the undergraduate programmes.

A student will be allowed to enter/re-enter only at the Odd Semester and can only exit after the Even Semester. Re-entry at various levels as lateral entrants in academic programmes should be based on the earned credits and proficiency test records.

The students shall be required to earn at least fifty per cent of the credits from the Higher Education Institution (HEI) awarding the degree or diploma or certificate: Provided further that, the student shall be required to earn the required number of credits in the core subject area necessary for the award of the degree or Diploma or Certificate, as specified by the degree awarding HEI, in which the student is enrolled.

A candidate who successfully completes a three year Bachelor's degree, with a minimum CGPA of 7.5 and wishes to pursue the fourth year of the undergraduate programme by opting a research project, shall be allowed to continue the programme with Research to obtain the Bachelor's degree with honors by research, while other candidates may continue their studies in the fourth year of the undergraduate programme with or without a research project along with other courses as prescribed for the programme to complete their Bachelor's degree with honors.

Candidates who successfully complete their four years Bachelor's degree with honors, either by research or coursework with research component and a suitable grade are eligible to enter the 'Doctoral (Ph.D.) Programme' in a relevant discipline or to enter the 'Two Semester Master's Degree programme".

Candidates, who wish to complete the undergraduate and the postgraduate programmes faster, may do so by completing the different courses equal to the required number of credits and fulfilling all other requirements in N-1 semesters (where N is the number of semesters of an undergraduate/ postgraduate programme). This facility is available for the programmes with a minimum duration of three years or six semesters. For example, a candidate may obtain his/her Six Semesters Bachelor's degree, after successfully completing five semesters of the programme, provided he/she has completed courses equal to the required/ prescribed number of credits and fulfills all other requirements for awarding the degree. Likewise, a candidate may obtain his/her Eight Semesters Bachelor's degree with honors, after successfully completing seven semesters of the programme, provided he/she has completed courses equal to the required number of Credits and fulfills all other requirements for awarding the Bachelor's degree with honors.

Similarly, candidates may complete both the undergraduate and the postgraduate programmes in slow track. They may pursue the three years or six semester programmes in 4 to 5 years (8 to 10 semesters) and four years or eight semester programmes in 5 to 6 years (10 to 12 semesters). As a result, the higher education institutions have to admit candidates not only for programmes, but also for subjects or courses. But the new admissions are generally made in the beginning of an academic year or the beginning of odd semesters.

5.2 NATIONAL SKILLS QUALIFICATIONS FRAMEWORK

The National Skills Qualifications Framework (NSQF) is a competency-based framework that organizes qualifications according to a series of knowledge, skills and aptitude. The NSQF levels, graded from one to ten, are defined in terms of learning outcomes which the learner must possess regardless of whether they are obtained through formal, non-formal or informal learning. National Occupational Standards (NOS) are statements of the skills; knowledge and understanding needed for effective performance in a job role and are expressed as outcomes of competent performance. They list down what an individual performing that task should know and also are able to do. These standards can form the requirements. Just as each job role may require the performance of a number of tasks, the combination of NOSs corresponding to these tasks form the Qualification Pack (QP) for that job role. The NOSs and QPs for each job role corresponding to each level of the NSQF are being formulated by the respective Sector Skill Councils (SSCs) set up by National Skill Development Corporation (NSDC) with industry leadership. The curriculum which is based on NOSs and QPs would thus automatically comply with NSQF.

General Education has to be synchronized/ aligned with skill and Vocational Education as per National Skills Qualifications Framework. The level descriptors are given below as described in UGC Guidelines on National Skills Qualifications Framework. The curriculum should be designed in a manner that at the end of year-1, year-2 and year-3, students are able to meet below mentioned level descriptors for level 5, 6 and 7 of NSQF, respectively: The progressive curriculum proposed shall position knowledge and skills required on the continuum of novice problem solvers (at entry level of the program) to expert problem solvers (by the time of graduation):

At the end of first year–Ability to solve well defined problems.

At the end of second year– Ability to solve broadly defined problems.
At the end of third year–Ability to solve complex problems that are ill-structured requiring multi-disciplinary skills to solve them.
During fourth year-Experience of workplace problem solving in the form of internship or research experience preparing for higher education or entrepreneurship experience.

6 ACADEMIC BANK OF CREDITS (ABC)

The Academic Bank of Credits (ABC), a national-level facility will promote the flexibility of the curriculum framework and inter-disciplinary/multi-disciplinary academic mobility of students across the Higher Education Institutions (HEIs) in the country with appropriate "credit transfer" mechanism. It is a mechanism to facilitate the students to choose their own learning path to attain a Degree/Diploma/Certificate, working on the principle of multiple entries and exit as well as anytime, anywhere, and any level of learning. ABC will enable the integration

of multiple disciplines of higher learning leading to the desired learning outcomes including increased creativity, innovation, higher order thinking skills and critical analysis. ABC will provide significant autonomy to the students by providing an extensive choice of courses for a programme of study, flexibility in curriculum, novel and engaging course options across a number of higher education disciplines/institutions.
The multiple entry and exit options for students is facilitated at the undergraduate and Master's levels. It would facilitate credit accumulation through the facility created by the ABC scheme in the "Academic Bank Account" opened for students across the country to transfer and consolidate the credits earned by them by undergoing courses in any of the eligible HEIs. The ABC allows for credit redemption through the process of commuting the accrued credits in the Academic Bank Account maintained in the ABC for the purpose of fulfilling the credits requirements for the award of certificate/ diploma/degree by the authorized HEIs. Upon collecting a certificate, diploma or degree, all the credits earned till then, in respect of that certificate, diploma or degree, shall stand debited and deleted from the account concerned. HEIs offering programmes with the multiple entry and exit system need to register in the ABC to enable acceptance of multidisciplinary courses, credit transfer, and credit acceptance.

The validity of credits earned will be for a maximum period of seven years or as specified by the Academic Bank of Credits (ABC). The procedure for depositing credit earned, its shelf life, redemption of credits, would be as per UGC (Establishment and Operationalization of ABC scheme in Higher Education) Regulations, 2021.

Study Webs of Active Learning for Young Aspiring Minds (SWAYAM :) is India's national Massive Open Online Course (MOOC) platform (www.swayam.gov.in), designed to achieve the three cardinal principles of India's Education Policy: access, equity, and quality. The University Grants Commission (Credit Framework for Online Learning Courses through SWAYAM) Regulations, 2021 have been notified in the Gazette of India, which now facilitates an institution to allow up to 40 per cent of the total courses being offered in a particular programme in a semester through the online learning courses offered through the SWAYAM platform. Universities with approval of the competent authority may adopt SWAYAM Courses for the benefit of the students. A student will have the option to earn credit by completing quality-assured MOOC programmes offered on the SWAYAM portal or any other online educational platform approved by the UGC/ the regulatory body from time to time

7. APPLICATION AND APPROVAL

There will be an application form in the prescribed format that has to be filled by the candidate. The Application will be scrutinized by the university with essential supporting documents prescribed by the University and will give the approval regarding the confirmation of admission.

8. ADMISSION PROCEDURE

8.1. During the time of admission the candidate must submit all the necessary documents in original that support the claim made in the application form.

8.2. The candidates will get the admissions only after getting approval regarding the eligibility of the certificates, as directed by the University guidelines.

8.3. All the decisions taken by the University of Mysore with regard to the course or any matter that is not mentioned over here, is up to the University and all the candidates are liable to follow those decisions.

9. SCHEME OF INSTRUCTION

9.1 Regarding the scheme of instructions, each course offered may have three components- Lecture (L), Tutorial (T) and Practical (P). Lectures are given by the faculties (Regular and Visiting) appointed by the institution both online and offline in blended learning mode. Tutorial session consists of group discussion/self-study /desk work/seminar presentation and other effective methods. Practical or Skill component consist of the applications of the theory content that has to be given either in lab, skill training centres or industry.

9.2 The medium of instruction shall be in English or Kannada as decided by the Board of Studies (BOS). However, the students have to write the exam in English only.

9.3 Credits: One hour session of lecture per week amount to one credit. Two-hour session of tutorial or practical per week amounts to one credit. For the purpose of a teacher, one hour of lecture session, one hour of tutorial session and one hour of practical session are all equal to one hour of workload.

10. BLENDED MODES (BL) AS A NEW MODE OF TEACHING-LEARNING

Blended learning (BL) mode is to be used to help learners develop 21st century skills along with the effective learning and skill development related to the subject-domains. Every institute should strive to be a model institute to demonstrate a successful implementation of BL in the higher education of our country.

UGC suggests implementing Blended Mode (BL) as a new mode of teaching-learning in higher education. BL is not a mere mix of online and face-to-face mode, but it refers to a well-planned combination of meaningful activities in both the modes. The blend demands consideration of several factors, mainly focusing on learning outcomes and the learner centred instructional environment.

Implementing BL requires a systematic, planned instructional process. An effective teaching learning process in a blended environment calls for understanding and skills of using appropriate pedagogies with suitable technologies. The UGC Concept Note provides guidelines for implementation of BL.

Pedagogies for Online and Face-to-face Modes

Learner-centred teaching-learning activities include several cognitive processes which enable learners to be communicative, confident, creative and cooperative. Learners in BL environments are not visualised as passive learners, but active learners generating ideas, assimilating knowledge individually and in teams. Once learning resources are provided on an

online platform, students sitting in the classroom need not again listen to the instructor. The time, then, can be used for engaging them in activities. Even their online time can be used innovatively for making online sessions more effective and interesting. There are a few learning processes for both online and face-to-face mode.

Higher education learners are adult learners who come with their own world of experience, previous knowledge gained at schooling level and previous years of education, exposure to other sources of knowledge, etc. Even pre-session resources suggested by teachers help them some knowledge, information. Lecturing of teacher assuming the learners are empty boxes is no more a preferred pedagogy. Learners, instead, can contribute by sharing their knowledge, ideas, and views, either in the classroom or else on online platforms.

BL mode will provide this opportunity to learners to a great extent. Resources can be uploaded and external links can be posted on Learning Management systems prior to classroom sessions. These Out-of-class resources prove useful at least for acquiring information. Once the students' study through the resources, classroom time can be utilized fruitfully in discussions. Online platforms such as discussion forums, shared documents, blogs, etc. may be used to help them share their ideas and knowledge on a common platform.

Innovative trends in Evaluation and Assessment

Out-of-box thinking about summative as well as formative evaluation is expected from the teacher implementing BL mode. The following paragraphs throw light on a few innovative strategies. The list is not exhaustive but mentions a few points with the expectation of continuous exploration of such strategies by the teachers.

Summative Evaluation Strategies

Open book examination:

It is a right way to move away from the conventional approach of examination where remembering and reproducing is prime concern. In real functioning beyond formal education, life is all about open book examination. Hence in Higher Education system, we must prepare students for work life by making them acquainted with open book examinations. It will also facilitate better understanding and application of the knowledge with a better potential for its positive impact.

Group examinations even for conventional theory papers:

Such an approach is followed some time for project and also practical lab assessments. But for theory type examinations it is generally not followed. The group examinations once introduced for theory papers can improve the average performance of a class as students would be encouraged to share their knowledge with each other and also help them improve their general understanding.

Spoken / Speaking examinations:

These types different approached can be introduced now with the support of new generation of technologies. They can make examination faster and easier and also can be helpful to students with different abilities

On demand examinations:

In most cases students are forced to write examination in a single go and collectively. However, with advent of new methods which are technology based and also blending of teaching-learning and examinations in new form, it would be a good approach to offer examination on demand to offer more flexibility and student centricity.

Formative Evaluation Strategies e-Portfolio

e-Portfolio is not only a compilation of a few best assignments, activities of a learner throughout the programme, but his/her reflections about the assignments, experience and challenges faced during the process of working on these assignments, overall approach, attitude, philosophy towards life as a learner and also his/her academic resume. e-Portfolio is a comprehensive tool which becomes a mirror to a learner for the world.

Creative Products

Innovative Pedagogies and relevant ICT tools enable learners to come out with creative products as an individual or group learning activities. These products are learning experiences in the beginning, but learners should always be given corrective feedback about their outputs. Once feedback is sought, learners need to be given chance to improve on their products and then can be considered for formative evaluation. E.g., preliminary concept-map can be revised after discussion of the topic, summarization and feedback. Revised concept- map can be assessed.

One creative/collaborative activity may then be led towards another product which can be an assessment activity. E.g., Group or individual presentations by self-learning would be a learning activity and not an assessment activity. Once teacher provided corrective feedback during such presentations, learners can be expected to revise the same presentations, add a small write-up/info graph/video to it and submit as an assignment. Creative assignments such as digital stories, Cartoon strips, drama scripts, e-Newsletter, e- Magazine, Recorded interviews of stakeholders, Case studies, etc. can be used for formative assessment.

Classroom/Online Quizzes

Though paper-pencil tests, over-use of question-answers may be discouraged for formative assessments, a few ICT tools for quizzes and games can be used eventually for formative assessment.

Use of AI tools for Proctoring as well as assessments:

During the Covid time, many exams were forced to be conducted in an online mode. These were supported by variety of tools which came into being in recent times and were based on proctoring through Artificial Intelligence tools. However, AI as technology can be used for many more assessments like, attention levels, speed of learning, level of learning etc. Hence new tools should be experimented with for examinations and assessments.

11. INDUSTRIAL EXPOSURE TRAINING

11.1 In the fourth and sixth semester every student may undergo project – Phase I and project Phase II respectively to get the exposure of the respective industry or training and skill centres conveniently arranged during the course of in these semesters. The head of the institution and the authorized person of the training and skill centre shall issue a certificate to the effect that the student has satisfactorily undergone the industrial training for the prescribed period.

11.2 Project report will be evaluated by the University in the form of Training report, Log-book and Viva- voce.

11.3 Evaluation of the both these Projects is for 100 marks and that has been divided into three components.

a) C1 -20 Marks (Log book & Training Report).
b) C2-20 Marks (Viva-voce conducted Internal Examiner).
c) C3- 60 Marks (Viva-voce conducted by External Examiners).

11.4. The candidate who wishes to continue the course in fourth year also must under go two Research oriented Projects Phase I and Phase II in seventh and eighth semester respectively.

12. SKILL ENHANCEMENT PROGRAMME

12.1 In all the specified semesters there will be a Skill Enhancement Programme that is incorporated in the curriculum, with the aim of achieving appropriate platform and domain skill exposure related to each course and demanded by the industry.

12.2 The skill enhancement programs are evaluated by the University /Institute /Accreditation body. An authorized body will issue performance certificates to the students based on their involvements and efficiency. The students also have to submit a detailed report to the Institute. These Skill Enhancement programmes are devised, monitored and evaluated in keeping with the university guidelines.

12.3 The students can undergo Skill enhancement programmes either in the institute or other institutions /skill training centres /industries. The institute shall facilitate the students those who prefer to do skill enhancement programmes from other institutions /skill training centres /industries (across India and abroad), which are willing to associate with our institute signing Mou.

12.4 The students will have to complete their Skill enhancement programmes to get the skills which are indispensable regarding their career advancement.

12.5 Evaluation of the Skill Enhancement Programme is for 50 marks and that has been divided into three components.

a) C1 -10 Marks (Skill Enhancement Certificate).
b) C2 -10 Marks (Skill Enhancement Report evaluated by Internal Examiner).
c) C3- 30 Marks (Viva-voce conducted by Internal and External Examiners).

13. SCHEME OF ASSESSMENT

Total marks for each course shall be based on continuous assessments and semester end examinations. As per the decision taken at the Karnataka State Higher Education Council, it is necessary to have uniform pattern of 40: 60 for IA and Semester End theory examinations respectively and 50:50 for IA and Semester End practical examinations respectively.

Total Marks for each Theory course=100% Continuous assessment (C1) =20%marks Continuous assessment (C2) = 20% marks Semester End Examination (C3) = 60%marks

Total Marks for each Practical/Skill course=100% Continuous assessment (C1) =20%marks Continuous assessment (C2) = 30% marks [including 10% for Record/Work book] Semester End Examination (C3) = 50%marks

13.1 Evaluation process of IA marks shall be as follows.

- The first component (C1) of assessment is for 20% marks. This shall be based on test, seminar, case study, field work, project work etc. This assessment and score process should be completed after completing 50% of syllabus of the course/s and within 45 working days of semester program
- The second component (C2) of assessment is for 20% marks. This shall be based on test, assignment, seminar, case study, fieldwork, internship/industrial practicum/project work etc. This assessment and score process should be based on completion of remaining 50 percent of syllabus of the courses of the semester.
- During the 17^{th} – 19^{th} week of the semester, a semester end examination shall be conducted by the Institution for each Course. These forms the third and final component of assessment (C3) and the maximum marks for the final component will be 60% for theory and 50% for Practical/Skill Course.
- In case of a student who has failed to attend the C1 or C2 on a scheduled date, it shall be deemed that the student has dropped the test. However, in case of a student who could not take the test on scheduled date due to genuine reasons, such a candidate may appeal to the Program Coordinator / Principal. The Program Coordinator / Principal in consultation with the concerned teacher shall decide about the genuineness of the case and decide to conduct special test to such candidate on the date fixed by the concerned teacher but before commencement of the concerned semester end examinations.

The outline for continuous assessment activities for Component-I (C1) and Component-II (C2) of a course shall be as under.

13.1 **Outline for continuous assessment activities for C1 and C2**

Activities	**C1**	**C2**	**Total Marks**
Session Test	10marks	10marks	20
Seminars/ Presentations/ Activity	10marks		10

Case study/ Assignment/Field work/Record or Work Book/Project work etc.		10marks	10
Total	20marks	20marks	40

13.2 **Components of continuous assessment activities for C1and C2**					
	C1			C2	
	Max marks	To be reduced to		Max marks	To be reduced to
Session test	20	10		20	10
Assignment		10		Quiz	05
				Project	05
				Role Play	05
				Charts/Models	05
				Case study	05
				Group discussion	05
				Crosswords	05
				Presentation	05
				Review–movie/Book	05
				presentation	05
				e–content preparation	05
				Any two activities from the above list to be conducted, according to the convenience of teacher depending upon the number of students 5x2 =10marks	
Total		20marks		20 marks	

a) For practical/Skill course of full credits, Seminar shall not be compulsory. In its place, marks shall be awarded for Practical Record Maintenance. (The ratio is 50%:50%)
b) Conduct of Seminar, Case study /Assignment, etc. can be either in C1or in C2 component at the convenience of the teacher concerned.
c) The teachers concerned shall conduct test / seminar / case study, etc. The students should be informed about the modalities well in advance.
d) The evaluated courses/assignments of component I (C1) and component II (C2) shall be provided to the candidates and the IA register has to be maintained by the department.
e) The evaluated courses/ assignments of component I (C1) and component II (C2) shall be maintained at the department till the announcement of the results of the examination of the semester concerned.
f) The marks of the internal assessment shall be published on the notice board/website of the College for the information of the students.
g) The Internal assessment marks shall be communicated to the Controller of Examinations at least 10 days before the commencement of the Semester End

examination and the Controller of Examinations shall have the access to the records of such periodical assessments.

h) There shall be no minimum in respect of internal assessment marks.
i) Internal assessment marks may be recorded separately. A candidate, who has failed or rejected the result, shall retain the internal assessment marks.

14. SUBJECTIVE REGULATIONS:

14.1Under AECC a candidate has to study English and additionally choose any ONE of the languages namely, Kannada, French, Malayalam and Hindi. And also, candidate has to pursue Environmental studies and Constitution of India under AECC category.

14.2 Change of languages once chosen will not be permitted during the period of the program.

14.3 In the case of foreign nationals, the requirement of an Indian language may be waived by the University of Mysore. In such an eventuality, the University may permit the foreign national student for private study of choice of any one foreign language. Such a student will not be evaluated for C1 and C2 marks. However, for the final grade calculation of 60 marks of C3 will be equated to 100 marks.

15. ATTENDANCE

15.1Only those students who are scoring 75% of attendance shall be permitted to take C3 examination for that course.

15.2 A candidate who does not satisfy the minimum attendance percentage (75%) shall re-join the course unless producing medical certificates and paying required fees by obtaining prior permission from the University if needed.

16. BOARD OF EXAMINERS

16.1 There shall be a board of examiners for each course, constituted by the University for scrutinizing and approving the question paper and scheme of evaluation.

16.2 There will be only a single valuation for all the papers.

17 QUESTION PAPER PATTERN

17.1 Internal Assessment Tests (IAT): The IAT will carry a maximum of 20% weightage (20 marks) of total marks of a course.

17.2 SEMESTER END EXAMINATION (SEE):

The Semester End Examination for all the courses for which students who get registered during the semester shall be conducted. SEE of the course shall be conducted after fulfilling the minimum attendance requirement as per the University norms. The BOS of the University has prepared the SEE framework and the question paper pattern for SEE is presented below for 60 marks.

PATTERN OF QUESTION PAPER

TIME: 2 HOURS MARKS: 60

PART – A

Answer any FIVE out of Eight questions. Each question carries 3 marks. (5x3= 15)

1. ----------

2. ----------

3. ----------

4. ----------

5. ----------

6. ----------

7. ----------

8. ----------

PART – B

Answer any THREE out of Five questions. Each question carries 5 Marks. (3x5 =15)

8. ----------

9. ----------

10. ----------

11. ----------

12. ----------

PART – C

Answer ONE of Two questions. Each question carries 15 Marks (1x15=15)

13. ----------

14. ----------

PART – D

Answer ONE of Two questions. Each question carries 15 Marks (1x15=15)

15. ----------

16. ----------

18. CONDUCT OF EXAMINATIONS

- A candidate shall register for all the courses/papers of a semester for which he/she fulfills the requirements, when he/she appears for the examination of that semester for the first time.
- There shall be Theory and Practical examinations at the end of each semester, ordinarily during November-December for odd semesters and during May-June for even semesters, as prescribed in the Scheme of Examinations.
- Unless otherwise stated in the schemes of examination, practical examinations shall be conducted at the end of each semester. They shall be conducted by two examiners, one internal and one external. The statement of marks sheet of practical examinations shall be sent to the office of the Controller of Examinations by the respective departments immediately after the practical examinations.
- The candidate shall submit the record book for practical examination duly certified by the course teacher and the H.O.D/staff in-charge. It shall be evaluated at the end of the Semester during the practical examination.

19. MINIMUM REQUIREMENTS FOR A PASS:

a) No candidate shall be declared to have passed the Semester Examination as the case may be under each course/paper unless he/she obtains not less than 35% marks in theory examination /practical examination and 40% marks in the aggregate of theory / practical examination and internal assessment put together in each of the courses and 40% marks (including IA) in Project work and viva wherever prescribed.

b) A candidate shall be declared to have passed the program if he/she secures at least 40% of marks or a CGPA of 4.0 (Course Alpha-Sign Grade P) in the aggregate of both internal assessment and semester end examination marks put together in each unit such as theory papers / practical / fieldwork / internship / project work / dissertation / viva-voce, provided the candidate has secured at least 40% of marks in the semester end examinations in each unit.

c) The candidates who pass all the semester examinations in the first attempt only are eligible for ranks, provided they secure at least CGPA of 6.00 (Alpha-Sign Grade B+)

d) A candidate who passes the semester examinations in parts (more than one attempt) is eligible only for a Class, CGPA and Alpha-Sign Grade but not for ranking.

e) The results of the candidates who have passed the last semester examination but not passed the lower semester examinations shall be declared as NCL (Not Completed the Lower Semester Examinations). Such candidates shall be eligible for the degree only after completion of all the lower semester examinations.

f) If a candidate fails in a subject, either in theory or in practical, he/she shall appear for that subject only at any subsequent regular examination, as prescribed for completing

the programme. He/she must obtain the minimum marks for a pass in that subject (theory and practical, separately) as stated above.

g) Candidates who fail in lower semester examinations may go to the higher semesters and take the lower semester examinations

20. CLASSIFICATION OF SUCCESSFUL CANDIDATES

An alpha-sign grade, the eight-point grading system, as described below may be adopted. The declaration of result is based on the Semester Grade Point Average (SGPA) earned towards the end of each semester or the Cumulative Grade Point Average (CGPA) earned towards the completion of all the eight semesters of the programme and the corresponding overall alpha-sign grades. If some candidates exit at the completion of first, second or third year of the four years Undergraduate Programmes, with Certificate, Diploma or the Basic Degree, respectively, then the results of successful candidates at the end of second, fourth or sixth semesters shall also be classified on the basis of the Cumulative Grade Point Average (CGPA) obtained in the two, four, six or eight semesters, respectively, for the award of

- Certificate in Arts/ Science/ Commerce
- Diploma in Arts/ Science/ Commerce
- Bachelor's Degree in Arts/ Science/ Commerce
- Bachelor's Degree with Honors in a Discipline/Subject

In addition to the above, successful candidates at the end of tenth semester of the integrated Master's Degree Programmes, shall also be classified on the basis of CGPA obtained in the ten semesters of the Programmes. Likewise, the successful candidates of one year or two semester's Master's Degree Programmes are also classified on the basis of CGPA of two semesters of the Master's Degree Programmes.

Final Result / Grades Description

Semester GPA/ Program CGPA	**Alpha-Sign / Letter Grade**	**Semester/Program % of Marks**	**Result / Class Description**
9.00-10.00	**O** (Outstanding)	90.0-100	Outstanding
8.00-<9.00	**A+** (Excellent)	80.0-<90.0	First Class Exemplary
7.00-<8.00	**A** (Very Good)	70.0-<80.0	First Class Distinction
6.00-<7.00	**B+** (Good)	60.0-<70.0	First Class
5.50-<6.00	**B** (Above Average)	55.0-<60.0	High Second Class
5.00-<5.50	**C** (Average)	50.0-<55.0	Second Class
4.00-<5.00	**P** (Pass)	40.0-<50.0	**Pass Class**

Below 4.00	**F** (Fail)	Below 40	Fail/Reappear
Ab (Absent)	-	Absent	-

21. REJECTION OF RESULTS:

- A candidate may be permitted to reject result of the whole examination of any semester. Rejection of result course/paper wise or subject wise shall not be permitted.
- The candidate who has rejected the result shall appear for the immediately following examination.
- The rejection shall be exercised only once in each semester and the rejection once exercised shall not be revoked.
- Application for rejection of results along with the payment of the prescribed fee shall be submitted to the Registrar (Evaluation) through the College of study together with the original statement of marks within 30 days from the date of publication of the result.
- A candidate who rejects the result is eligible for only SGPA/CGPA or Class and not for ranking.

22.IMPROVEMENT OF RESULTS

- A candidate who has passed in all the papers of a semester may be permitted to improve the results by reappearing for the whole examination of that semester.
- The reappearance may be permitted during the period of N+2 years (where N refers to the duration of the programme) without restricting it to the subsequent examination.
- The student may be permitted to apply for improvement examination 45 days in advance of the pertinent semester examination whenever held.
- If a candidate passes in all the subjects in reappearance, higher of the two aggregate marks secured by the candidate shall be awarded for that semester. In case the candidate fails in the reappearance, candidate shall retain the earlier result.
- A candidate who has appeared for improvement examination is eligible for class/CGPA only and not for ranking.
- Internal assessment (IA) marks shall be shown separately. A candidate who wants to improve the result or who, having failed, takes the examination again or who has appeared for improvement shall retain the IA marks already obtained.
- A candidate who fails in any of the semester examinations may be permitted to take the examinations again at a subsequent appearance as per the syllabus and scheme of examination in vogue at the time the candidate took the examination for the first time. This facility shall be limited to the following two years.

23. SUBJECTS OF STUDY

23.1 **Ability Enhancement Courses**

Ability Enhancement (AE) Courses can be divided into two categories:

a) AE Compulsory Courses (AECC): The universities may have common curriculum forthese papers. There may be one paper each at least in the first

four semesters viz.

(i) Environmental Studies and (ii) Constitution of India.

(ii) In addition to these, two languages shall be studied in the first four semesters of theUndergraduate Programmes.

b) LANGUAGES:

- Two languages are to be studied out of which one shall be English and the other shall be either Kannada or an Indian Language or other foreign language:

- The language syllabus and curriculum is prepared by the institution and not mandatory to follow university syllabus and curriculum of the university as required by specialized skill curriculum of respective courses

Skill Enhancement Courses (SEC):

- The colleges can offer from a common pool of papers listed by KSHEC/ National Regulatory Bodies such as UGC or GEC/ NHERC or the universities may frame some papers, in addition to the list suggested.

24. TRANSFERS OF ADMISSION:

Transfer of admissions is permissible only for odd semesters for students of other universities and within the University.

24.1. **Conditions for transfer of admission of students within the University.**

A His/her transfer admission shall be within the intake permitted to the college.

B Availability of same combination of subjects studied in the previous college.

C He/she shall fulfill the attendance requirements as per the University Regulation.

D He/she shall complete the programme as per the regulation governing the maximum duration of completing the programme.

24.2. **Conditions for transfer admission of students of other Universities.**

a) A Candidate migrating from any other University may be permitted to join odd semester of the degree programme provided he/she has passed all the subjects of previous semesters / years as the case may be. Such candidates must satisfy all other conditions of eligibility stipulated in the regulations of the University.
b) His/her transfer admission shall be within the intake permitted to the college.
c) He/she shall fulfill the attendance requirements as per the University Regulation.
d) The candidate who is migrating from other Universities is eligible for overall SGPA/CGPA or Class and not for ranking.
e) He/She shall complete the programme as per the regulation governing the maximum duration of completing the programme as per this regulation

i. **Any other regulations not mentioned above shall be resolved by the Vice – Chancellor in consultation with the designated authorities of the University of Mysore, which shall be final and firm.**

ii. **Wherever the regulation is silent, the provisions of university regulations are applicable.**

B.Sc- Hons (Artificial Intelligence and Machine Learning)

Proposed Scheme of Teaching & Evaluation for B.Sc. (Hons) with Artificial Intelligence and Machine Learning as Core subject.

Semester I									
Sl. No	**Course Code**	**Title of the Course**	**SEE**		**CIE**		**L+T+P**	**Total Marks**	**Credits**
			Theory	**Practical**	**C1**	**C2**			
1	**BAM01**	Language - I	60	-	20	20	3+0+0	100	**3**
2	**BAM02**	English– I	60	-	20	20	3+0+0	100	**3**
3	**BAM03**	Object oriented programming in C++	60	-	20	20	4+0+0	100	**4**
4	**BAM04**	Mathematical Foundation I	60	-	20	20	3+0+0	100	**3**
5	**BAM05**	Open Elective-I	60	-	20	20	3+0+0	100	**3**
6	**BAM06**	Lab 1: Programming in C++	-	50	20	30	0+2+4	100	**3**
7	**BAM07**	Environmental studies	30	-	10	10	2+0+0	50	**2**
8	**BAM08**	Health & Wellness	-	15	5	5	0+0+2	25	**1**
9	**SEC 1**	Skill Enhancement Course- Linux Programming	-	30	10	10	0+2+2	50	**2**
Total Credit									**24**

B.Sc. –Hons (Artificial Intelligence and Machine Learning)

Semester II									
Sl. No	**Course Code**	**Title of the Course**	**SEE**		**CIE**		**L+T+P**	**Total Marks**	**Credits**
			Theory	**Practical**	**C1**	**C2**			
1	**BAM09**	Language - II	60	-	20	20	3+0+0	100	**3**
2	**BAM10**	English– II	60	-	20	20	3+0+0	100	**3**
3	**BAM11**	Java Programming	60	-	20	20	4+0+0	100	**4**
4	**BAM12**	Mathematical Foundation-II	60	-	20	20	3+0+0	100	**3**
5	**BAM13**	Open Elective-II	60	-	20	20	2+1+0	100	**3**
6	**BAM14**	Lab 2: Programming Lab-JAVA	-	50	20	30	0+2+4	100	**3**
7	**BAM15**	Constitution of India	30	-	10	10	2+0+0	50	**2**
8	**BAM16**	Physical Education - YOGA	-	15	5	5	0+0+2	25	**1**
9	**SEC 2**	Skill Enhancement Course- Design Thinking	-	30	10	10	0+2+2	50	**2**
Total Credit									**24**

B.Sc. –Hons. (Artificial Intelligence and Machine Learning)

Semester III									
Sl. No	**Course Code**	**Title of the Course**	**SEE**		**CIE**		**L+T+P**	**Total Marks**	**Credits**
			Theory	**Practical**	**C1**	**C2**			
1	**BAM17**	Introduction to A I	60	-	20	20	4+0+0	100	**4**
2	**BAM18**	Python Programming	60	-	20	20	4+0+0	100	**4**
3	**BAM19**	Data Structure and Computer Algorithm	60	-	20	20	3+1+0	100	**4**
4	**BAM20**	Elective- I – Computer Architecture/ Introduction to Multimedia Technology/Office Automation	-	50	20	30	0+2+6	100	**4**
5	**BAM21**	Lab 3: Python Programming	-	50	20	30	0+2+6	100	**4**
6	**SEC 3**	Skill Enhancement Course- Internet of Things and Robotics	-	30	10	10	0+2+2	50	**2**
Total Credit									**22**

B.Sc. -Hons (Artificial Intelligence and Machine Learning)

Semester IV									
Sl. No	**Course Code**	**Title of the Course**	**SEE**		**CIE**		**L+T+P**	**Total Marks**	**Credits**
			Theory	**Practical**	**C1**	**C2**			
1	**BAM22**	Introduction to M L	60	-	20	20	4+0+0	100	**4**
2	**BAM23**	Fussy Logic and Neural Networks	60	-	20	20	4+0+0	100	**4**
3	**BAM24**	R- Programming	60	-	20	20	2+1+0	100	**3**
4	**BAM25**	Design and Analysis of Algorithm	60	-	20	20	3+1+0	100	**4**
5	**BAM26**	Lab 4: R- Programming	-	50	20	30	0+2+4	100	**3**
6	**BAM27**	Lab 5: Machine Learning -I	-	50	20	30	0+2+4	100	**3**
7	**SEC4**	Capstone -Project Work-Phase I	-	60	20	20	0+2+4	100	**3**
Total Credit									**24**

B.Sc. -Hons (Artificial Intelligence and Machine Learning)

Semester V									
Sl. No	**Course Code**	**Title of the Course**	**SEE**		**CIE**		**L+T+P**	**Total Marks**	**Credits**
			Theory	**Practical**	**C1**	**C2**			
1	**BAM28**	Machine Learning Techniques	60	-	20	20	4+0+0	100	**4**
2	**BAM29**	Artificial Intelligence and Knowledge Representation	60	-	20	20	3+1+0	100	**4**
3	**BAM30**	Principles of Deep Learning	60	-	20	20	3+0+0	100	**3**
4	**BAM31**	Mobile Application Development	-	50	20	30	0+2+4	100	**3**
5	**BAM32**	Elective -II Business Data Analytics/ Ethics and social implications of AI/ Operating Systems	60	-	20	20	2+1+0	100	**3**
6	**BAM33**	Lab6: Machine Learning Lab-II	-	50	20	30	0+2+4	100	**3**
7	**SEC5**	Skill Enhancement Course- Ethical Hacking	-	30	10	10	0+2+2	50	**2**
Total Credit									**22**

B.Sc. -Hons (Artificial Intelligence and Machine Learning)

Semester VI									
Sl. No	**Course Code**	**Title of the Course**	**SEE**		**CIE**		**L+T+P**	**Total Marks**	**Credits**
			Theory	**Practical**	**C1**	**C2**			
1	**BAM34**	Pattern Recognition	60	-	20	20	4+0+0	100	**4**
2	**BAM35**	Natural Language Processing	-	50	20	30	0+2+6	100	**4**
3	**BAM36**	Elective Cyber Security/ Soft Computing/ Business Intelligence	60	-	20	20	4+0+0	100	**4**
4	**BAM37**	Project Work Lab	-	50	20	30	0+2+6	100	**4**
5	**BAM38**	Data Base Management System	-	50	20	30	0+2+6	100	**4**
6	**BAM39**	Capstone- Project work – Phase II	-	60	20	20	0+2+6	100	**4**
Total Credit									**24**

B.Sc. -Hons (Artificial Intelligence and Machine Learning)

Semester VII									
Sl. No	**Course Code**	**Title of the Course**	**SEE**		**CIE**		**L+T+P**	**Total Marks**	**Credits**
			Theory	**Practical**	**C1**	**C2**			
1	**BAM40**	Image Analytics	60	-	20	20	4+0+0	100	**4**
2	**BAM41**	Cloud Computing	-	50	20	30	0+2+6	100	**4**
3	**BAM42**	Research Methodology	60	-	20	20	4+0+0	100	**4**
4	**BAM43**	Elective IV- Data Visualization/ Information Retrieval/ Cyber Threat Intelligence	60	-	20	20	4+0+0	100	**4**
5	**BAM44**	Research Project – Phase I	-	50	20	30	0+2+6	100	**4**
Total Credit									**20**

Semester VIII									
Sl. No	**Course Code**	**Title of the Course**	**SEE**		**CIE**		**L+T+P**	**Total Marks**	**Credits**
			Theory	**Practical**	**C1**	**C2**			
1	**BAM45**	Software Engineering	60	-	20	20	3+0+0	100	**4**
2	**BAM46**	Operations Research	60	-	20	20	3+0+0	100	**4**
3	**BAM47**	Advanced A I and Applications	60	-	20	20	4+0+0	100	**4**
4	**BAM48**	Research Project- Phase II	-	50	20	30	0+2+6	100	**4**
5	**BAM49**	Human Machine Interaction	60	-	20	20	4+0+0	100	**4**
5	**BAM50**	Quantitative Aptitude	-	30	10	10	0+2+2	50	**2**
Total Credit									**22**

B.Sc. -Hons. (Artificial Intelligence and Machine learning)

2023-24 Syllabus (Detailed)

As per the NEP 2020

PROGRAMME OUTCOMES

a) Showed excellent subject knowledge and completed the assigned responsibilities effectively and efficiently in line with the desired quality standards.

b) To identify, formulate, analyze, and solve complex problems and arrive at authenticated conclusions, use analytical and critical thinking.

c) Establishing and developing evidence-based solutions for complex issues with definite demands while taking public health, safety, cultural, societal, and environmental concerns into consideration is significant.

d) Develop your ability to listen, read, communicate effectively, and articulate complex ideas while taking into account the abilities and needs of various audiences.

e) Possess the traits of a good entrepreneur and present novel ideas to launch new business ventures.

f) Acquire the qualities of a good leader and engage in efficient decision making.

g) Graduates will possess the skills necessary to take on any responsibility as an individual or as a member of multidisciplinary teams, as well as the ability to lead a team.

h) Perform as socially responsible individual with ethical ideals and accountable to ethically validate any activities or decisions before proceeding and actively contribute to the societal concerns.

i) Recognize and fulfil their own educational needs in a changing world in ways that will keep them competent and enable them to advance knowledge.

j) Apply management principles to one's own work to manage projects and in a multidisciplinary environment, demonstrating knowledge of and understanding of these principles.

B.Sc. -Hons. (Artificial Intelligence and Machine learning)

Course Syllabus & Curriculum

SEMESTER I

English I

UNIT 1 – PROSE

1. THE GOLDEN TOUCH (MIDAS TOUCH)

2. THE SELFISH GIANT

3. LALAJEE

UNIT 2 – POETRY

1. LUCY GRAY

2. MATILDA

3. INCIDENT OF THE FRENCH CAMP

UNIT 3 – SHORT STORIES

1. A DAY'S WAIT

2. THE TATTERED BLANKET

UNIT 4 – ONE ACT PLAYS

1. THE INFORMER

2. THE TRIAL SCENE FROM "THE MERCHANT OF VENICE"

UNIT 5 – COMMUNICATIVE GRAMMAR

1. FUNCTION GRAMMAR & FUNCTIONAL ENGLISH EXERCISES AT THE END OF EVERY LESSONS.

SEMESTER I- LANGUAGE I

MALAYALAM I

UNIT I

A. CHERUKADHA ENNA SAHITHYA ROOPAM

B. VAIKKOM MUHAMMED BASHEER, BASHEERINDE KADHAKALUDE PRATHYEKATHAKAL

C. KADHAKALUDE VIVARANAM, JANMADINAM, TIGER

D. AISHUKUTTY,

E. VISHWAVIKYATHAYA MOOK,

UNIT II

A. NOVEL ENNA SAHITHYA ROOPAM

B. MALAYATTUR RAMAKRISHNAN, VERUKALILE SHAILIYUM GHADANAYUM

C. VERUKAL - ADHYAYAM ONN, ADHYAYAM REND

D. ADHYAYAM MOON, ADHYAYAM NAAL

E. ADHYAYAM FIVE, ADHYAYAM SIX

UNIT III

A. ORU MANUSHYAN

B. THENMAVU,

C. BHOOMIYUDE AVAKASHIKAL

D. MADHAVIKUTTY ENNA EZHUTHUKARI,

E. BALYAKALASMARANAKAL

UNIT IV

A. UPANYASAM EZHUTHUMBOL SRADHIKENDAKARYANGAL, SHASTRAPUROGATHI
B. KERALATHILEKALAKAL, MADHYAMANGALUDE SWADHEENAM ADHUNIKA SAMUHATHIL
C. VIDHYARTHI RASHTREEYAM, DESHEEYODHGRANTHANAM
D. LOKHA SAMADHANAM, THOZHILADHISHTITHA VIDHYABHYASAM

UNIT V

A. ADHYAYAM SEVEN, ADHYAYAM EIGHT

B. ADHYAYAM NINE, ADHYAYAM TEN

C. ADHYAYAM ELEVEN, ADHYAYAM TWELVE

D. KADHAPATHRANGAL, RAGHU, MANIYAN ATHIMBAR, YAGNESHWARAYYAR, ADHINARAYANAYYAR

E. KADHAPATHRANGAL, AMMULU, LAKSHMI, GEETHA

SEMESTER I – LANGUAGE I

HINDI I

UNIT I

1. S RAJENDRA PRASAD – BHARATHIYA SANSKRUTHI
2. RAMVRUBHA VENIPURI- RAJYA
3. GANJAN MADHAV MUKTHBOTH- RASTRAPITH MAHATHMA GANDHI
4. HARISANKAR PARSAI - NINDHA RAS

UNIT II

1. CHANDRASDHAR SHARMA GULERI – USNE KAHA DHA
2. PREMCHAND- EID GAGH
3. JAYASHANKAR PRASAD – GUNDA
4. BHISHM SAHANI – CHEEK KA DHAVAD

UNIT III

A. AAPKA BANTI – SARANSH

UNIT IV

A. ANUVADH ABHYAS

UNIT V

A. PATHRALEKHAN, SHIKAYATHI PATHRA

B. VYAVASAYIK PATHRA

C.POSTMAN KI SHIKAYATH

D.MOOLYA SOOCHI MANGNE KA PATHRA

SEMESTER – I

LANGUAGE I – FRENCH

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SEMESTER – I
Object Oriented Programming in C++

Course Objectives: To introduce he concepts of Object-Oriented Programming Paradigm and the programming constructs of C++.

Unit 1: Introduction to C++ - key concepts of Object-Oriented Programming –Advantages – Object Oriented Languages – I/O in C++ - C++ Declarations. Control Structures: - Decision Making and Statements: If ... else, jump, goto, break, continue, Switch case statements - Loops in C++: for, while, do - functions in C++ - inline functions – Function Overloading

Unit 2: Classes and Objects: Declaring Objects – Defining Member Functions – Static Member variables and functions – array of objects –friend functions – Overloading member functions – Bit fields and classes – Constructor and destructor with static members.

Unit 3: Operator Overloading: Overloading unary, binary operators – Overloading Friend functions – type conversion – Inheritance: Types of Inheritance – Single, Multilevel, Multiple, Hierarchal, Hybrid, Multi path inheritance – Virtual base Classes – Abstract Classes- Pointers – Declaration – Pointer to Class, Object – this pointer – Pointers to derived classes and Base classes– Arrays – Characteristics – array of classes.

Unit 4: Files – File stream classes – file modes – Sequential Read / Write operations – Binary and ASCII Files – Random Access Operation – Templates – Exception Handling - String – Declaring and Initializing string objects – String Attributes – Miscellaneous functions– Memory models – new and delete operators – dynamic object – Binding, Polymorphism and Virtual Functions

REFERENCE:

1. E. Balagurusamy, Object-Oriented Programming with C++, TMH, 1998
2. Maria Litvin& Gray Litvin, C++ for you, Vikas publication, 2002.
3. John R Hubbard, Programming with C, 2nd Edition, TMH publication, 2002.

SEMESTER – I
Mathematical Foundation -I

Course objectives: Introduce concepts of mathematical logic for analysing propositions and proving theorems. To Work with relations and investigate their properties. Investigate functions as relations and their properties. Introduce basic concepts of graphs and paths.

Unit I: The Foundations: Logic and Proofs: Propositional logic – Applications of Propositional logic – Propositional equivalences – (Exclude Propositional satisfiability, Applications of satisfiability, Solving satisfiability problems, and its related problems) – Predicates and Quantifiers – Rules of inference.

Unit II: Relations: Relations and their properties – Representing relations – Closures of relations – Partial orderings (Theorems statement only; Exclude lexicographic ordering - Exclude Lattices)- Matrices: Introduction – operations – inverse – Rank of a matrix, solution of simultaneous linear equations – Eigen values and Eigen Vectors.

Unit III: Counting: The basic of counting - The pigeonhole principle – Permutation and Combinations – Applications of recurrence relations – Solving recurrence relations – Divide and Conquer algorithms and recurrence relations. (All theorems and Results statement only)

Unit IV: Graphs: Graphs and Graphs models, (Excluding Biological networks; Tournaments; all its related examples and problems) – Graph terminology and special types of graphs – Representing graphs and Graph isomorphism – Connectivity (paths – connectedness in undirected graphs – paths and isomorphism – counting paths between vertices) – shortest path problems.

REFERENCE:

1. Discrete Mathematics and its applications, Seventh Edition, Kenneth. H. Rosen, Mc Graw Hill Publishing Company,2012. 2.
2. Discrete Mathematics, M. Venkataraman, N. Sridharan and N. Chandrasekaran, The National Publishing Company,2009.

Programming in Lab C++

Course Objectives

To experience the concepts of Object-Oriented Programming Paradigm and the programming constructs of C++ at application level like decision making statements. Looping statements, functions, concepts like overloading, inheritance, polymorphism, virtual functions, constructors and destructor.

PROGRAMMES

Program 1: Write a C++ Program to create a class to implement the data structure STACK. Write a constructor to initialize the TOP of the STACK. Write a member function PUSH () to insert an element and member function POP () to delete an element check for overflow and underflow conditions.

Program 2: Write a C++ Program to create a class ARITHMETIC which consists of a FLOAT and an INTEGER variable. Write member functions ADD (), SUB (), MUL (), DIV () to perform addition, subtraction, multiplication, division respectively. Write a member function to get and display values.

Program 3: Write a C++ Program to read an integer number and find the sum of all the digits until it reduces to a single digit using constructors, destructors and inline member functions.

Program 4: Write a C++ Program to create a class FLOAT that contains one float data member. Overload all the four Arithmetic operators so that they operate on the object FLOAT.

Program 5: Write a C++ Program to create a class STRING. Write a Member Function to initialize, get and display stings. Overload the operators ++ and == to concatenate two Strings and to compare two strings respectively.

Program 6: Write a C++ Program to create class, which consists of EMPLOYEE Detail like E-Number, E-Name, Department, Basic, Salary, Grade. Write a member function to get and display them. Derive a class PAY from the above class and write a member function to calculate DA, HRA and PF depending on the grade.

Program 7: Write a C++ Program to create a class SHAPE which consists of two VIRTUAL FUNCTIONS Calculate Area () and Calculate Perimeter () to calculate area and perimeter of various figures. Derive three classes SQUARE, RECTANGLE, TRIANGE from class Shape and Calculate Area and Perimeter of each class separately and display the result.

Program 8: Write a C++ Program to create two classes each class consists of two private variables, a integer and a float variable. Write member functions to get and display them. Write a FRIEND Function common to both classes, which takes the object of above two classes as arguments and the integer and float values of both objects separately and display the result.

Program 9: Write a C++ Program using Function Overloading to read two Matricesss of different Data Types such as integers and floating-point numbers. Find out the sum of the above two matrices separately and display the sum of these arrays individually.

Program 10: Write a C++ Program to check whether the given string is a palindrome or not using Pointers.

Program 11: Write a C++ Program to create a File and to display the contents of that file with line numbers.

Program 12: Write a C++ Program to merge two files into a single file.

SEMESTER – I
Environmental Studies

Course Objectives: On successful completion of the course, the students will able

a) To learn importance of Environment and Natural resources
b) Know the importance of conservation
c) Aware of Various environmental issues
d) To learn Human population and its impact on Environment

Unit I

Multidisciplinary nature of environmental studies – Definition-scope and importance -Need for public awareness.

Unit II

Natural Resources -Renewable and non-renewable resources: - Natural resources and associated problems- Forest resources: Use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forest and tribal people; Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems; Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies; Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies; Energy resources: Growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources. Case studies; Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification; Role of an individual in conservation of natural resources; Equitable use of resources for sustainable lifestyles.

Unit III

Ecosystems- Concept of an ecosystem; Producers, consumers and decomposers; Energy flows in the ecosystem; Food chains, food webs and ecological pyramids; Introduction, types, characteristic features, structure and function of the following ecosystem; Forest ecosystem; Grassland ecosystem; Desert ecosystem; Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)

Unit IV

Biodiversity and its conservation- Introduction – Definition: genetic, species and ecosystem diversity; Biogeographical classification of India; Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values; Biodiversity at global, National and local levels; India as a mega-diversity nation; Hot spots of biodiversity -Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts; Endangered and endemic species of India; Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.

Unit V

Environmental Pollution-Causes, effects and control measures of: - Air pollution, Water pollution, Soil pollution, Marine pollution, Noise pollution, Thermal pollution, nuclear hazards Solid waste Management: Causes, effects and control measures of urban and industrial wastes. Role of an individual in prevention of pollution. Disaster management: - Disasters due to natural calamities such as flood, earthquake, rain, cyclone and landslides; Manmade disasters – crisis due to fires, accidents, strikes; Loss of property and life

REFERENCE:

Erach Bharucha, ―A Text Book for Environmental Studies‖, Text Book of University Grants Commission

Peavy. H.S.D.R. Rowe and George T, ―Environmental Engineering‖, New York: McGraw Hill

Metcalf and Eddy, ―Wastewater Engineering: Treatment and reuse‖, Tata McGraw Hill

SEMESTER – I
Skill Enhancement Course

Linux Programming- Lab

1. Write a Linux script to find the number of users who have logged in.

2. Write a Linux script to see the current date, user name and current directory.

3. Write a Linux script to print the numbers 5,4,3,2,1 using While loop.

4. Write a Linux script to set the attributes of a file.

5. Write a Linux script to convert lowercase to uppercase using tr-utility.

6. Write a Linux script to copy and rename a file.

7. Write a Linux script to add 5 numbers and find the average.

8. Write a Linux script to convert a decimal number to hexadecimal conversion.

9. Write a Linux script to find the factorial of a number.

10. Write a Linux script to check for palindrome. Section-B

11. Write a Linux script to display Hello World in Bold, Blink effect and in different colors like red, green etc.

12. Write a Linux script to display a multiplication table.

13. Write a Linux script to perform arithmetic operations using case.

14. Write a Linux script to add two real numbers.

15. Write a Linux script to display the following pattern:

1

22

333

4444

55555

Write a Linux script to find the sum of digits and reversing of a given number.

SEMESTER II

ENGLISH II

UNIT I POETRY

A. THE PALANQUIN BEARERS : SAROJINI NAIDU
B. NEXT , PLEASE : PHILIP LARKIN
C. MIRROR : SYLVIA PLATH
D. THE LAMENTATION OF THE OLD PENSIONER : W.B. YEATS

UNIT II PROSE

A. HEADACHE : R K NARAYAN
B. HOW TO ESCAPE FROM INTELLECTUAL RUBBISH : BERTRAND RUSSEL
C. MARRIAGE IS A PRIVATE AFFAIR : CHINUA ACHEBE
D. THE TOWN BY THE SEA : AMITAV GHOSH

UNIT III ONE ACT PLAYS

A. THE NEVER NEVER NEST : CEDRIC MOUNT
B. THE FORUM : SHAKESPEARE

UNIT IV SHORT STORY

A. TWO GIFTS OF THE MAGI: O. HENRY
B. THE MODEL MILLIONAIRE: OSCAR WILDE
C. THE UNICORN IN THE GARDEN: JAMES THURBER

UNIT V COMMUNICATING ACCURATELY, APPROPRIATELY AND FLUENTLY

A. AGREEING AND DISAGREEING
B. SEEKING AND GIVING PERMISSION
C. PERSUADING AND DEBATING
D. SOUNDS AND SYMBOLS IN ENGLISH
E. WORD AND SENTENCE STRESS
F. EFFECTIVE USE OF INTONATION

INTERPERSONAL COMMUNICATION

A. EFFECTIVE LISTENING
B. UNDERSTANDING THE AUDIENCE
C. PERCEPTUAL CLARITY
D. CHANNEL AWARENESS
E. ROLE OF NON-VERBAL COMMUNICATION
F. PRAGMATICS

SEMESTER II- LANGUAGE II

Malayalam II

UNIT I

A. SHRI CHITHIRATHIRUNAAL
B. UTHSAVAMATATHILE KOCHUTHAMBURATTI
C. SETHUPARVATHIBHAIYUDE KOUMARAM
D. REGENCY BHARANAM
E. ORU SAHODARI PIRAKUNNU

UNIT II

A. SREE CHITHIRATHIRUNAAL AVASANATHE NADUVAZHI
B. RAJYABHARANAM
C. KSHETRA PRAVESHANA VILAMBARAM
D. SIR C P YUDE THIRODHANAM
E. SREE CHITHIRA YUGAM AVASANIKUNU

UNIT III

A. UROOB
B. THIRAKADHA ENNA SAHITYAROOPAM
C. NEELAKUYIL - ITHIVRITHAM
D. NEELAKUYILILE SREEDHARAN NAIR
E. SHANKARAN NAIR ENNA KADHAPATHRATHINDE SAVISHESHATHAKAL

UNIT IV

A. NEELAKUYIL
B. LAKSHMIYAMMA
C. NAMBOOTHIRI
D. CHATHAPPAN
E. MOITHU

UNIT V

A. EESHWARAN ARASTIL
B. N.N PILLAYUDE NADAKATHINDE PRATHYEKATHAKAL
C. EESHWARAN ARASTIL - RANGAM ONN
D. EESHWARAN ARASTIL - RANGAM REND
E. KADHAPATHRANGAL - EINSTEIN, EESHWARAN, PISHACH

SEMESTER II- LANGUAGE II

HINDI II

UNIT I

- KABIR- SAKHI
- SURDHAS- PADH
- RAHIM- DHOHE
- MEERA BHAI - PADH

UNIT II

- SURYAKANDH THRIPADI NIRALA – SNEHH NIRSHAR
- SUMITHRANANTH PANDH – DHARTHI KITHNA DHETHI HEY
- RAMDHARI SINGH DHINKAR – JANATHANTHR KA JANMU
- BHAVANI PRASAD MISRA – SNEHH PADH

UNIT III

- GAJANAN MADHAV MUKTHIBODH – JAN JAN KA CHEHARA EK
- NAGARJUN – SACH NA BOLNA
- KEDHAR NADH AGARVAL -JO JEEVAN KI DHULA CHATKAR BADA HUA HE
- DHARMAVEER BHARATHI – SUBHASH KI MRUTHYU PAR

UNIT IV

- HINDI SAHATHYE KA SARAL ITHIHAS KAL VIBHAJAN
- ARTHALANKAR

ELEMENTARY FRENCH

Course Objective

To enable the students to write simple sentences in French, to translate simple sentences from French to English and from English to French. To converse in simple language in French.

UNIT - I

Introduction to the languages, Letters of alphabet and their pronunciation, Different accents used in written French, distinction between vowels and consonant words. Self-introduction (Name, Age, Nationality, Profession, etc). Presenting and introducing another person, Greetings - How to reply to greetings, at the reception desk of a hotel, restaurant etc.

UNIT - II

French terms - Fruits, Vegetables, Beverages, Meat, Egg, Fish, Etc. Utensils used in Kitchen and Restaurant, Name of the Personnel in Hotel, Restaurant and Kitchen.

UNIT - III

Numerical from 1 to 100 the time of the day. Menu items in French term for Breakfast, Lunch and Dinner. Compilation of French menu for Breakfast, Lunch and Dinner. Culinary terms in French - French to English - English to French.

UNIT - IV

Conversation related to Restaurant - Simple conversation asking for menu card, placing Order for food, asking for wine, Beer, Coffee, Tea. Conversation related to Front Office - Asking for room - enquiring for facilities, asking for rates of room - checkout time.

REFERENCE BOOKS

1. *Apprends les Francais – Publisher Saraswati House New Delhi.*
2. *La Langue et La civilization Francaises – G Mauger*
3. *S.Bhattacharya - French for Hotel Management and Tourism - Frank Bros and Co. publishers limited.*
4. *Rajeswari Chandrasekar, Rekha Hangal, Chitra Krishnan - A Votre Service 1- General Book Deport, 1691, Delhi*

SEMESTER II

Java Programming

Course Objectives: To study in detail about the concepts of Object-Oriented Programming Paradigm and the programming constructs of JAVA and also provide an Outline to the benefits and applications of objects-oriented programming concepts and defend how JAVA differs from other programming languages.

Unit I: Fundamentals of Object-Oriented Programming: Object-Oriented Paradigm – Basic Concepts of Object-Oriented Programming – Benefits of Object-Oriented Programming – Application of Object-Oriented Programming. Java Evolution: History – Features – How Java differs from C and C++ – Java and Internet – Java and www –Web Browsers. Overview of Java: simple Java program – Structure – Java Tokens – Statements – Java Virtual Machine.

Unit II: Constants, Variables, Data Types - Operators and Expressions – Decision Making and Branching: if, if...else, nested if, switch? : Operator - Decision Making and Looping: while, do, for – Jumps in Loops - Labelled Loops – Classes, Objects and Methods.

Unit III: Arrays, Strings and Vectors – Interfaces: Multiple Inheritance – Packages: Putting Classes together – Multithreaded Programming- Managing Errors and Exceptions – Applet Programming – Graphics Programming.

Unit IV: Managing Input / Output Files in Java: Concepts of Streams- Stream Classes – Byte Stream classes – Character stream classes – Using streams – I/O Classes – File Class – I/O exceptions – Creation of files – Reading / Writing characters, Byte-Handling Primitive Data Types – Random Access Files.

REFERENCE:

1. Programming with Java – A Primer - E. Balagurusamy, 3rd Edition, TMH.
2. The Complete Reference Java 2 - Patrick Naughton& Hebert Schildt, 3rd Edition, TMH
3. Programming with Java – John R. Hubbard, 2nd Edition, TMH

SEMESTER – II
Programming Lab- JAVA

Course Objectives: To introduce the concepts of Object-Oriented Programming Paradigm and the programming constructs of JAVA at application level- like decision making statements. Looping statements, overloading, inheritance, polymorphism, constructors and destructors

Program 1: Write a Java Applications to extract a portion of a character string and print the extracted string.

Program 2: Write a Java Program to implement the concept of multiple inheritance using Interfaces.

Program 3: Write a Java Program to create an Exception called pay out-of-bounds and throw the exception

Program 4: Write a Java Program to implement the concept of multithreading with the use of any three multiplication tables and assign three different priorities to them.

Program 5: Write a Java Program to draw several shapes in the created windows

Program 6: Write a Java Program to create a frame with four text fields name, street, city and pin code with suitable tables. Also add a button called my details. When the button is clicked its corresponding values are to be appeared in the text fields.

Program 7: Write a Java Program to demonstrate the Multiple Selection List-box.

Program 8: Write a Java Program to create a frame with three text fields for name, age and qualification and a text field for multiple line for address

Program 9: Write a Java Program to create Menu Bars and pull-down menus.

Program 10: Write a Java Program to create frames which respond to the mouse clicks. For each event with mouse such as mouse up, mouse down, etc., the corresponding message to be displayed. **Program 11:** Write a Java Program to draw circle, square, ellipse and rectangle at the mouse click positions.

Program 12: Write a Java Program which open an existing file and append text to that file.

SEMESTER – II
MATHEMATICAL FOUNDATIONS II

Course Objectives: This units aims to provide basic understandings on statistics and statistical tools used in hypothesis testing. To describe and predict averages in terms of probabilities of events with the help of theorems.

Unit I: Introduction to statistics – primary and secondary data – classification, tabulation and Diagrammatic Representation of statistical data – Bar-charts, Pie-diagrams '– Graphical Representation of data – Histograms, Frequency polygon, Ogives.

Unit II: Measures of dispersion – characteristics – coefficient of dispersion - Coefficient of variation-Moments – skewness and kurtosis – Pearson 's coefficient of skewness - Bowley 's coefficient of Skewness – Coefficient of skewness based upon moments.

Unit III: Simple correlation – Karl Pearson 's coefficient of correlation – correlation coefficient for A bivariate frequency distribution – Rank correlation – Regression lines of regression – Properties of regression coefficient – standard error – Tests of significance based on t, Chi- square and F distributions with respect to mean, variance.

Unit IV: Events and sets – sample space – concept of probability – addition and multiplications Theorem on probability – conditional probability and independence of events – Baye's Theorem – concept of random variable – Mathematical Expectation.

REFERENCE:

1. Statistics, Dr. S. Arumugam and A. Thangapandi Issac, New Gamma Publication house, 2002.
2. Kishore S. Trivedi - Probability and statistics with reliability queuing and Computer Science Applications - Prentice Hall of India (P) Ltd., New Delhi -1997.

3. Discrete Mathematics - Seymour Lipschutz, Marc Lars Lipson Schaum's Outlines- by, 3rd Edition., Tata McGraw Hill, Education Pvt. Ltd., New Delhi. 5 th Reprint, 2012
4. Statistical Methods, S.P.Gupta, Sultan Chand and sons Publications, 4th Edition 2011.

SEMESTER – II
Constitution of India

Course Objectives: Enable the students to understand the structure of Indian constitution, the human rights, structure of state and central government and also about the judiciary. This course intends to develop knowledge on fundamentals of Indian Constitution.

Unit 1: Constitution – Structure and Principles - Meaning and importance of Constitution - Making of Indian Constitution – Sources - Salient features of Indian Constitution

Unit 2: Fundamental Rights and Directive Principles - Fundamental Rights -Fundamental Duties 2.3: Directive Principles

Unit 3: Government of the Union - President of India – Election and Powers - Prime Minister and Council of Ministers - Lok Sabha – Composition and Powers -Rajya Sabha – Composition and Powers

Unit 4: Government of the States - Governor – Powers - Chief Minister and Council of Ministers- Legislative Assembly – Composition and powers - Legislative Council – Composition and powers

Unit 5: The Judiciary - Features of judicial system in India-Supreme Court –Structure and jurisdiction 5.3: High Court – Structure and jurisdiction - Administrative organization and constitution -Federalism in India – Features - Local Government -Panchayats –Powers and functions; 73rd and 74th amendments 6.3: Election Commission – Organization and functions-Citizen oriented measures – RTI and PIL – Provisions and significance

REFERENCE:

1. Durga Das Basu, Introduction to the Constitution of India, Gurgaon; LexisNexis, 2018 (23rd edn.)
2. M.V.Pylee, India's Constitution, New Delhi; S. Chand Pub., 2017 (16th edn.)
3. J.N. Pandey, The Constitutional Law of India, Allahabad; Central Law Agency, 2018 (55th edn.)
4. Constitution of India (Full Text), India.gov.in. National Portal of India, https://www.india.gov.in/sites/upload_files/npi/files/coi_part_full.pdf

5. Durga Das Basu, Bharatada Samvidhana Parichaya, Gurgaon; LexisNexis Butterworths Wadhwa, 2015
6. Kb Merunandan, Bharatada Samvidhana Ondu Parichaya, Bangalore, Meragu

SEMESTER – II
Skill Enhancement Course- Design Thinking

Course Objectives: To understand the basic concepts of Design Thinking and how it differs from a product design. To perceive the design thinking cycles like finding the right problem to solve, empathise, ideation, prototyping and testing.

Unit I: Introduction -Definition, Origin of design thinking, Importance of design thinking, Design vs Design thinking, understanding design thinking and its process model, Design thinking tools. Types of the thinking process.

Unit II: Empathize: Design thinking phases, how to empathize, Role of empathy in design thinking, Understanding empathy tools: Customer Journey Map, Personas.

Unit III: Ideation: Challenges in idea generation, need for systematic method to connect to user, Visualize, Empathize, and Ideate method, Importance of visualizing and empathizing before ideating.

Unit IV: Prototyping: What is a prototype? - Prototyping as a mindset, prototype examples, prototyping for products. Process of prototyping- Minimum Viable prototype -Testing Prototypes: Prototyping for digital products: What is unique for digital, Preparation; Prototyping for physical products: What is unique for physical products, Preparation.

REFERENCE:

1. S. Saliva Hanan, S. Suresh Kumar, D. Praveen Sam, ―Introduction to Design Thinking, Tata Mc Graw Hill, First Edition, 2019.

2. Kathryn McElroy, ―Prototyping for Designers: Developing the best Digital and Physical Products, O'Reilly, 2017.
3. Michael G. Luchs, Scott Swan, Abbie Griffin, Design Thinking – New Product Essentials from PDMA, Wiley, 2015.
4. Vijay Kumar, ―101 Design Methods: A Structured Approach for Driving Innovation in Your Organization, 2012.