



VIGNAN'S

Foundation for Science, Technology & Research

(Deemed to be **UNIVERSITY**)

-Estd. u/s 3 of UGC Act 1956

R22 **Academic
Regulations**

In Compliance with NEP 2020



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PREFACE

'You are born to Blossom' – What an inspiring title the book authored by APJ Abdul Kalam and Arun K Tiwari carries. The journey to blossom has got to be heralded by education. The purpose of education is to ensure that the 'Life Blossoms'. Earning a degree and getting a placement should be the just happening things, and should not become the only celebrated goals for education. In the book cited above, Honourable Kalam, Former President of India, underscores that "The scheme of civil society depends on Educating young people to become enlightened citizens and adults who are responsible, thoughtful and enterprising"

VIGNAN aims to seed these concepts in every learner who transits through this temple of learning. The doctrine of VIGNAN entitled R-22 contains the principles of policies laid down by the University, to realize the spirit of "Blossoming the lives" providing a foundation-strong professional education on the ethos of 'Creative learning for Critical thinking and Critically analysing for Creative decision making'. Certainly, our University is one of the earliest Universities, in fact the University is a trend setting one in completely internalising the concepts of the policies brought out in National Education Policy (New Educational Policy) NEP-2020, and inculcating the spirit in R-22. The R-22 document articulates the Academic Regulations of the University, which is being presented now and shall be in force with immediate effect from the academic year 2022-23, not only for those who have joined in 2022, also the aspirants of 2021-22 are enabled into the navigation.

R-22 presents a novel design for the academic pursuit, making an exploratory cross disciplinary traversal for a learner who should find learning both holistic and experiential. The learner is ensured to enjoy the continuity in learning and the learner is supported to align and realign, enroute utilising the benefits of constructive feedbacks that s/he receives because of continuous assessment. S/he will be empowered to enjoy the opportunities to explore, experiment and experience.

R-22 eliminates the melancholy of examinations. The expected severity of breakdown due to the anxiety of examination system is replaced by an affectionate assessment system, increasing the effectiveness in accomplishing the outcomes.

In brief, NEP-2020 compliant revised academic regulation of the University – the R-22, is VIGNAN's commitment to alleviate the acuteness in the present educational practices. It intends to provide a strategic solution to the critical observation made by Bharat ratna awardee, Professor. CNR Rao – "India has exam system, not education system. When will young people stop taking exams and do something worthwhile?" (Thought for the Day, Times of India 13.08.2022)

Here is R-22, which assures that the learners at VIGNAN are bound to do something worthwhile – very much worthwhile.

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B.Sc. R22-Academic Regulations, Curriculum and Course Contents

(Applicable for the students admitted into first year from the academic year 2022-23 onwards)

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EXECUTIVE ABSTRACT

R22 - Academic regulations, Curriculum and course contents, is an articulation of the VFSTR deemed to be University's commitment towards NEP-2020, with a view that it enables student(s) to maintain the spirit of continuous learning and continuous assessment to replace the normal tendency of preparing just before a test or an examination. The proposed framework accomplishes multi-disciplinary holistic education, continuous assessment along with multiple honorable exit options if a student falls short to complete the requirements to earn the degree within the stipulated period including the permissible spillover period.

R22 is oriented in line with NEP-2020, with higher weight given to continuous / formative assessment, which is an Integrated learning model comprising Learning – Thinking – Understanding – Skilling – Applying – Creating. Emphasis on continuous formative assessment with a creative summative assessment will facilitate the candidate to “Move away from high stake examinations – towards more continuous and comprehensive evaluation”.

The B.Sc. degree offered will be for three years (6 semesters) duration with honorable exit options, within this period candidate can exit with suitable certification that will enable him / her to have a professional career as well as serve as a reminder to return and update his / her qualification in the future. However, the intention of the learners is not to join for the award of the undergraduate certification / diploma but to acquire a B.Sc. degree.

A candidate can opt for an onward continuation to M.Sc. programme (two years), in such a case on successful completion both B.Sc. and M.Sc. degrees will be awarded. However, if a candidate opts for a lateral exit during the onward extension, after successful completion of first two semesters of M.Sc. study, then he / she will receive B.Sc. Honours degree. Such an extension is subjected to successful completion of requirements of 3 year B.Sc. programme at VFSTR.

Salient features of the regulations

- Continuous learning
- Continuous assessment
- Onward continuation to M.Sc. degree
- Lateral exit options
- Semester sabbatical option to pursue innovation, incubation, entrepreneurial and advanced exploratory activities and subsequent re-entry.
- Credit earning by credit transfer

1. INTRODUCTION

This document contains the academic regulations, scheme of assessments, curriculum, detailed syllabi, course contents with text / reference books recommended, course outcomes, skills to be acquired and the projects / assignments that are to be performed for each course for the conduct of 3-year B.Sc. degree programme.

1.1 Definition

For the purpose of R22 regulation, definitions as follows shall apply:

- **“Degree”** shall refer to the B.Sc. Degree Program.
- **“Course”** shall refer to such course(s) for which a student shall earn credits after due assessment as per the laid provisions. Each course shall comprise of Lecture (L), Tutorial



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(T) and Practice (P) Sessions. A course may have either or all the three components. Project is also treated as a course.

- **“Academic activities”** shall refer to the activities like Lecture (Physical Lecture Session), Tutorial (Participatory discussion / Self-study / Desk work / Quiz / Seminar presentation etc. activities that make the student absorb and assimilate the delivered contents effectively) and Practice / Practical sessions (includes Hands on experience / Practice / Field studies / Case studies etc. that enable the student to acquire the requisite skill).
- **“Continuous Assessment”** shall refer to the evaluation of the student spread over the entire semester on the various constituent components of the prescribed course.
- **“Semester”** shall refer to a period covering the two assessment periods viz. Formative and Summative Assessment period. A semester would generally be spread over twenty weeks.
- **“Course Drop”** shall refer to a student having to undertake a repeat of the Course(s) not being able to complete the Credit requirements of the Course(s), under the conditions stipulated in the regulation.
- **“Supplementary Examinations”** shall refer to the examination(s) conducted to allow the student to appear in the un-cleared / underscored Semester - End summative assessment component, with a view to accord him an additional opportunity to improve upon his previous score.
- **“Blank Semester”** shall refer to a Semester in which a student either does not register for any course at the beginning of the Semester OR chooses to DROP all courses OR is so compelled to DROP all the courses, as the case may be.
- **“Spill Over Semester”** shall refer to the additional semester(s) beyond the completion of prescribed normal semesters.
- **“AAA Section”** shall refer to the Academics, Assessment and Award Section of the Institute.
- **“Attendance”** refers to the Physical personal presence in an academic activity session.
- **“Summer Semester”** refers to a semester that is decided to be held during the intervening period of Even and Odd Semester (i.e. summer vacations period).
- **“Semester Drop”** shall refer to availing a blank semester. However, if drop is availed to pursue a creative extension activity, then it is defined as semester sabbatical.
- **“School”** refers to a division of institute dealing with two or more specific area of discipline / study comprising of the departments related with exclusive emphasis on trans-disciplinary research.
- **“Department”** refers to a division of institute dealing with a specific area of discipline / study.
- **“Grade Point”** refers to the quantification of the performance of a candidate in a particular course as defined herein.
- **“Honorable Exit Option”** refers to the Exit Options available to students, when they are unable to complete the prescribed three-year B. Sc. Degree program in five successive years.
- **“SGPA”** refers to the Semester Grade Point Average and is calculated as detailed in the regulations subsequently.
- **“CGPA”** refers to the Cumulative Grade Point Average and is calculated as detailed in the regulations subsequently.
- **“Division”** refers to the Division awarded to the student as per the mechanism detailed in the regulations subsequently.
- **“HoD”** refers to the Head of the respective Department, where the student is enrolled for his / her Branch of Study
- **“Internship”** refers to onsite Practice Training offered by reputed companies / Institutions, in India or abroad to be undertaken only upon prior approval of the respective HoD.
- **“Project”** refers to a course executed by a candidate on a specific research problem at VFSTR / any organization of repute. To be undertaken only upon prior approval of the respective HoD.
- **“Credit equivalence and credit transfer committee”** refers to the committee designated to look into for credit equivalence and credit transfer.

1.2 Academic Administration

The academic programmes of VFSTR are governed by the rules and regulations approved by the Academic Council from time to time. The various academic activities are conducted following a fixed time schedule duly approved by the Academic Council in line with the UGC regulations. The academic activities of VFSTR are followed meticulously as specified in the academic calendar as approved by the Academic Council. This academic calendar is shared with all the stake holders well before the beginning of the respective academic year. The curriculum and the course contents of all the programmes are discussed by the respective Board of Studies (BoS), analyzed and recommended for implementation. The Academic Council, being the highest statutory body, chaired by the Vice-Chancellor, meets at least twice or thrice a year and discusses, suggests and approves all the important academic matters related to curriculum and course contents in particular including the recommendations of BoS. These regulations were placed before the 31st Academic Council meeting held on 30-07-2022 and duly approved by the council.

1.3 Program Duration

For the B.Sc. programme the regular courses including theory and practice are offered over a period of three years in six semesters. The normal duration to complete the B.Sc. programme is three years. However, a student can avail the benefit of spillover period of 2 years, that is the maximum duration of five years can be availed by a candidate to complete the B. Sc. programme in a slower pace if he / she desires. The candidate failing to complete the requirements within 5 years will be considered for the honorable exit as applicable.

1.4 Courses and Credits

The term course is used in a broader sense to refer to so called papers such as 'theory course', 'practice course' etc. A course can be of theoretical and / or of practice nature and certain number of credits are allotted to it depending on the number of hours of instruction per semester. For a course offered in a semester, one hour of lecture (L) instructions carried out in a week is considered equivalent to one credit, whereas two hours of practice (P) sessions done in a week are considered equivalent to one credit respectively. Depending on the course two hours of tutorial (T) sessions may be considered equivalent to one credit. A student earns these credits when he / she successfully complete the course. Credits can also be obtained by successful completion of other recognized co-curricular and extra-curricular activities such as NCC, NSS. etc. The details of credits of such activities will be provided by the respective course coordinators and assessment of student performance in the activities will be carried out objectively by the constituted committees appointed by the Dean AAA. The criteria of assessment for these activities will include aspects like regular attendance in the programme and satisfactory completion of it through tests conducted at University level or by participation / performance at university level, state level or national level events etc.

1.4.1 Content Delivery of a Course

Content delivery of a Course in the B.Sc. Degree Program shall be through, either or all of the following Methods:

- i. **Lecture** - refers to Lecture Session(s) through classroom contact session wherein students will learn by listening. Denoted by "L".
- ii. **Tutorial** - refers to transaction(s) consisting of Participatory discussion / Self-study / Desk work / Brief presentations by students along with such other novel methods that enable a student to efficiently and effectively absorb and assimilate the contents delivered in the lecture sessions. Denoted by "T".
- iii. **Practice** - refers to Practice / Practical sessions and it consists of Hands on experience / Field Studies / Case Studies / Project, that equip the students to acquire the much required skill component. Denoted by "P".

1.5 B.Sc. Degree

All students formally and conventionally enroll for B.Sc. degree programme in triple-major (Mathematics, Statistics, Computer Science). They have to earn **120** credits for the award of degree as specified in the Curriculum.

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1.5.1 Onward Continuation to M. Sc. degree programme

After fulfilling the requirements of B.Sc., a candidate may choose for onward continuation to M. Sc. and earn 80 credits spread over four semesters, including one semester long project, to become eligible for award of M. Sc. (Annexure-2).

1.6 Composition of an Academic year

An academic year is composed of an Odd semester (20 – 22 weeks), an Even semester (20 – 22 weeks) and a Summer semester (6 – 8 weeks). The regular semester that begins in July / August is known as odd / first semester and the one that begins in December / January is known as even / second semester (Figure 1). The instructional days for a regular semester shall be a minimum of 90 working days exclusive of days earmarked for summative assessment.

| YEAR OF 12 MONTHS | | | | | | | | | | | |
|--------------------|----------------|----------------|---------------|---------------|----------------------|---------------|---------------|---------------|--------------|--------------|---------------|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| July/ Aug. | Aug./ Sept. | Sept./ Oct. | Oct./ Nov. | Nov./ Dec. | Dec./ Jan. | Jan./ Feb. | Feb./ Mar. | Mar./ Apr. | Apr./ May | May/ June | June/ July |
| ODD SEM/ FIRST SEM | | | | | EVEN SEM/ SECOND SEM | | | | | SUMMER SEM | |

Figure 1: Distribution of semesters during an Academic Year.

1.6.1 Before the commencement of the semester, a candidate has to pay the stipulated tuition fee and submit an application detailing the courses he / she intended to register, valid for that respective Odd / Even semester. The maximum number of credits per semester will be 25 credits. The intended semester wise coverage will be as presented in the curriculum.

1.6.2 Summer semester is a short duration semester program that will be generally conducted during the semester break between even semester and odd semester. The students having 'R' (Repeat grade) courses may register for the course work during this semester to get a chance for successfully completing the 'R' courses. In general, supplementary assessments are conducted in the later part of the summer semester. However, the courses offered in summer semester and the number of courses a student can register are subjected to academic and administrative convenience. A student may register up to a max. of 16 credits in a summer semester.

1.6.3 Exception to the routine practice of registering for 'R' courses in summer semester, a student can register in a course offered by a visiting expert during the summer vacation which may be equivalent to a major elective. The candidates can register for such courses within the scope of 16 credits.

1.7 Semester wise provisions

A student may register for a maximum of 25 credits per semester as prescribed or otherwise he / she may include the Repeat courses in the event of having not successfully completed a course or courses in the earlier semesters. However, a student may also opt to go in a slower pace to earn the credits less than the prescribed maximum of 25, including even 'Dropping' a semester for special reasons.

It should be clearly underscored that a candidate should on priority register for Repeat (R) credits if any, during a regular semester, within the said scope of 25 credits; in case he / she cannot be sure of completing the 'R' credits in Summer semester.

1.7.1 During the first three years from the date of admission to B. Sc., a candidate has to pay the semester / annual fees as prescribed irrespective of the less number of credits that he / she would register or even opt to Drop a semester.

1.7.2 If a candidate gets into spillover semester beyond three years up to a maximum of five years he / she has to pay semester fee proportional to the credits that he / she registered in that spill over semester as prescribed from time to time.

1.7.3 A candidate has to pay additional fee proportional to the number of credits for registering in a summer semester as prescribed from time to time.

2. CURRICULUM

The department prescribes semester-wise curriculum encompassing different courses. Every course offered will be designated in a L-T-P structure. The theory courses comprise of L (and / or T & P hours) whereas the practice courses include practice instructions (T) and Practical sessions (P). Amalgamation of theory courses with practical sessions is predominantly seen in this curriculum.

2.1 Distribution of credits

The overall distribution of credits for various categories of courses in the curriculum of B.Sc. programme is represented in Table (1) as given below.

Table 1: Credits Distribution for Various categories of courses

| Category of Courses | Number of Credits | Percentage of Credits |
|--|-------------------|-----------------------|
| Major Core Courses | 60 | 50.00 |
| Major Electives | 24 | 20.0 |
| Project | 04 | 3.33 |
| Humanities | 20 | 16.66 |
| Employability Skills | 05 | 4.16 |
| Physical Fitness / Orientation / NCC / NSS / Environmental Science / Students Activity Council (SAC) / Social activities | 07 | 5.83 |
| Total | 120 | 100 |

2.2 Organization of course contents

Courses offered in the program are composed of two modules covering all the course contents required for a candidate to obtain knowledge and skill. The contents in each module are further distributed among two Units; wherein Unit-1 contains 'Fundamentals and Broad perceptive' of the module. Unit-2 comprises of the extension / advanced topics of Unit-1 as well as necessary practice models for validation / applying the knowledge gained during L / T sessions. The modular period is about 8 weeks. The first Unit in a module may be covered in 3 to 4 weeks and the second Unit of the module maybe of 4 to 5 weeks (Figure 2). By the end of each module a candidate must be in a position to translate his / her L-based knowledge into P-based skill as prescribed in the curriculum. Individual formative assessment shall be in place for each module and a single semester-end summative assessment for the course composed of both the modules.

| YEAR OF 12 MONTHS | | | | | | | | | | | |
|---------------------|--------------|--------------|-------------|-----------------------|-------------|-------------|-------------|-------------|------------|------------|-------------|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| July / Aug. | Aug. / Sept. | Sept. / Oct. | Oct. / Nov. | Nov. / Dec. | Dec. / Jan. | Jan. / Feb. | Feb. / Mar. | Mar. / Apr. | Apr. / May | May / June | June / July |
| ODD SEM / FIRST SEM | | | | EVEN SEM / SECOND SEM | | | | SUMMER SEM | | | |
| Module- I | | Module- II | | | Module- I | | Module- II | | | | |
| U1 | U2 | U1 | U2 | | U1 | U2 | U1 | U2 | | | |

Figure 2: Unit-wise distribution of course contents in a module and their mapping with Academic Calendar; U= Unit

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3 CHOICE BASED CREDIT SYSTEM

The B.Sc. programme comprises of various courses from Sciences, Humanities, employability and life skills, project, sports and mainly focused on Mathematics, Statistics, Computer Science called as Major courses. VFSTR offers flexibility for students to choose courses of their choice and obtain the credits satisfying the minimum credits criterion.

3.1 Major core courses

Core courses comprising of triple majors are mandatory for every student. These are designed to offer the essential fundamental knowledge and skills required for the specific programme.

3.2 Major electives

A candidate has a choice to choose the courses within the triple-major. A list of major elective courses is pooled together, enabling a candidate to choose the electives from a pool so that he / she can focus to a specific theme. Elective courses are spread over two semesters from fifth to sixth semester, to enable students earn credits from a chosen pool. Candidate can also acquire a maximum of 4 credits through MOOCS (Swayam based NPTEL) which can be considered equivalent to one of the electives.

3.3 Project

Students should take up project work in any one of the triple-major courses based on his / her interest and work on it in VFSTR itself in sixth semester. Each candidate has to submit interim reports and a final report which is mandatory requirements towards the partial fulfillment of project credits requirements. It bears a weightage of 4 credits with duration of 90 working days. During the semester the student under the guidance of a faculty member(s) will involve in an innovative design / research through the application of his / her knowledge gained in various courses studied. He / she is therefore expected to present a survey of literature on the topic, work out a project plan and carry it out through computation / modelling / simulation. Through such a project work, the student is expected to demonstrate the data collection, data analysis, system analysis, design, presentation and execution skills with a valid conclusion. Performance in the project will also be assessed in the modular framework for formative and semester-end summative.

3.4 Humanities

Course content covers general studies and linguistic skills for the students during first to fourth semester.

3.5 Employability Skills

Course content covers analytical skills, employability skills and IT workshop for the students during first to fourth semester.

3.6 Binary graded courses

3.6.1 Physical Fitness

As physical fitness contributes to physical, mental and social development, it is offered to students. The credits are spread across 2 semesters in 1 year with 1 credit per semester. Students are imparted training through physical exercises.

3.6.2 Orientation course

Course content covers cross-cutting issues of the society like Gender Equality, Human Values, Professional Ethics, Moral and Ethical Values. Orientation course is offered for 1 year B.Sc. students and on successful completion earns 3 credits. All the students have to register during first / second semester and mandatorily obtain successful completion grade.

3.6.3 Courses with floating credits

With a view to imbibe social responsibility and all round development students are encouraged to participate in NCC / NSS / Students Activity Council (SAC) / Social activities. Such activities lead to awarding of 1 credit.

In case the candidate does not successfully complete the binary graded courses, they will be placed under 'R' category. However, such R should be completed in regular Odd / Even semester whenever these courses are offered. In special cases provision of summer semester may be provided.



4 ATTENDANCE

It is mandatory for the student to attend the course work in each semester as per the academic schedule of that semester. VFSTR expects 100% attendance. However, the attendance in each course shall not be less than 75 % of the aggregate of all L, T, P sessions conducted in that course.

- a) The attendance calculations will be periodically reviewed at the end of every 4 weeks. The details of attendance status will be shared with the parents / guardian. The final status of attendance will be reported at end of 15th week granting the advantage of the attendance for the 16th week for the purpose of attendance shortage calculations.
- b) The shortage of attendance may be condoned up to 10% on the ground of ill-health, social obligations, participating / representing in sports / cultural events, placement activities etc.
- c) Documentary evidence like medical reports and certificates issued by concerned bodies is to be produced on time as support for the attendance shortage due to ill-health. These cases are subjected to the scrutiny of a committee constituted for this purpose by the Vice-Chancellor. The decision of the committee shall be final.
- d) Prior approval has to be taken from the HoDs for the other types of leaves.
- e) The courses where the student shortage of attendance was not condoned shall be considered as 'Repeat' category courses and will be under 'R' grade in the student's semester transcript. Student should re-register for these courses during the summer semester or whenever the course is offered next time during the regular semesters. These re-registrations are subjected to the regulations at the time of re-registration. In case of core courses, the same core has got to be re-registered. However, in case of an elective a candidate may exercise a choice of choosing different elective in place of 'R' graded elective.

The students who are put into 'R' grade will not be allowed to take up the summative assessment in that semester. In case due to lack and/or delay in information, if he/she appears for the summative assessment in that course, office of AAA is empowered to cancel the attended exams. The scores obtained either in formative or summative assessment will not be considered for grading.

5 ASSESSMENT

Teaching-Learning and Assessment should go hand in hand and complement each other. Continuous assessment plays a vital role to enable the student to get synchronized with the teaching-learning process. Assessment mechanism adopted in the institute is aimed at testing the learning outcomes in tune with the outcome based model of education. The focus, is thus on assessing whether the outcomes are realized by the end of the course.

The performance of a student in each course is assessed on a continuous basis during the semester through various in-semester and end-semester assessment models. The marks awarded through continuous assessment are referred to as Formative assessment marks. The marks awarded through end-semester tests are referred to as Summative assessment marks (Figure 3). Both the formative and summative assessment marks are considered for awarding the final marks and the grade point in a particular course.

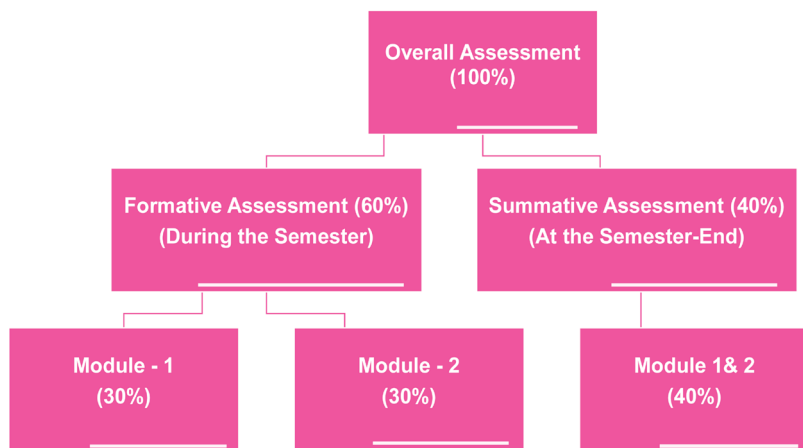


Figure 3 : Categories of Assessments in place for R22



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5.1 Marks distribution

For each course, the maximum sum of formative and summative assessment marks put together is 100, in the ratio of 60:40 respectively.

5.2 Qualifying criteria

To be declared successful in a course, a student must secure at least a grade 4.0 in a scale of 10 based on the total maximum marks which is inclusive of formative and summative assessment. The students should also get 35% from the maximum marks allotted for formative and summative assessments individually.

The hierarchy of qualifying criteria is as follows:

- i. Attendance compliance should be 75% or within condonable range; else the candidate is put into 'R' grade.
- ii. In formative assessment, a candidate should secure a minimum of 35% i.e., 21 marks out of 60; else the candidate is put into 'R' grade.
- iii. In summative assessment, a candidate should secure a minimum of 35% i.e., 14 marks out of 40; else the candidate is put into 'I' (Incomplete) grade.
- iv. Collectively the candidate should secure a min. grade of 4.0 in a scale of 10 after relative grading (section 7); else the candidate has to choose either 'R' or 'I' grade duly being counselled.
- v. A candidate who has secured grade less than 5 in a course may be permitted (optional) to volunteer to improve his / her grade by opting suitably 'R' or 'I' grade in that course.

The candidates with 'R' grade should re-register for 'R' courses either in Summer semester or in a regular semester as and when the courses are offered. The candidates in 'I' grade are allowed to appear for supplementary summative assessment whenever the semester-end assessments are conducted.

To assess binary graded courses / physical fitness / special projects / courses, not fitting into the categories described here, a suitable assessment procedure will be evolved in consultation with experts of that area and adjudicated by the committee constituted for that purpose. The decision given by the committee will be final. The appended assessment scheme shall be announced by the course coordinator during the commencement of course.

| YEAR OF 12 MONTHS | | | | | | | | | | | | |
|----------------------|----------------|----------------|---------------|---------------|----------------------|---------------|---------------|---------------|--------------|--------------|---------------|--|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | |
| July/ Aug. | Aug./ Sept. | Sept./ Oct. | Oct./ Nov. | Nov./ Dec. | Dec./ Jan. | Jan./ Feb. | Feb./ Mar. | Mar./ Apr. | Apr./ May | May/ June | June/ July | |
| ODD SEM/ FIRST SEM | | | | | EVEN SEM/ SECOND SEM | | | | | SUMMER SEM | | |
| Module- I | | Module- II | | | Module- I | | Module- II | | | | | |
| U1 | U2 | U1 | U2 | | U1 | U2 | U1 | U2 | | | | |
| Formative Assessment | | | | SA | Formative Assessment | | | | SA | | | |

Figure 4: Schedules of formative and summative assessments in line with Academic calendar. SA = Summative assessment.

5.3 L-based courses integrated with P / T

5.3.1 Formative Assessment

The scheme of formative assessment is designed to promote the continuous learning. Scheme consists of assessments planned at institute level and assessment that may be scheduled by the course instructor (Figure 4). Institute level assessments shall be scheduled by the office of AAA. Respective Faculty Member(s) shall declare the schedule of Continuous Practice Assessments (CPA), Quiz, Tutorials, Assignments, Seminars, Discussions, etc. Some of the

components may also however take place in an unscheduled manner like Surprise Tests. However, students shall be made aware of the assessment modalities that are going to be followed in a course by the faculty, under information to the HoD.

To monitor the progress of students, continuous assessment comprising of five targets (T1, T2, T3, T4 and T5) is advocated in each module for a maximum of 60 marks. For a class (or section) of 60 to 70 students, formative assessment commences by the announcement of module bank containing 10 problems for each module in a course. Nature of problems in the module bank shall be at the level of creative / exploratory / design / thought provoking covering the complete syllabus of a module at somewhat advanced / challenging level.

The purpose of creating module bank of 10 problems is to assign one problem each to 2 batches of 3 - 4 members. The batches are composed of randomly picked up candidates. These batches remain same for all courses and also for the P-sessions in the courses in that semester and are created in the beginning of that semester.

The purpose of assigning one problem to two batches is to create a healthy competitive spirit between the two batches.

The modality of evaluation of five targets is listed here under:

- a) **T1:** During 5th or 6th week of each module a classroom test shall be conducted. T1 consists of two parts: A and B.

Part A consists of one random problem from the module bank and vary from batch to batch. All the questions in the module bank shall be distributed among students and students shall know the question to be answered only on the day of test in the examination hall.

Part B consists of one common problem at fairly application / advanced level (**not at all prior notified**) from outside the module bank for all the students.

T1 shall be paper based and proctored test for a period of 60 min (maximum) which shall be assessed for 30 marks and downscaled to 10 marks.

For the students who for justifiable reasons could not attend the classroom test on the scheduled day, a re-test maybe conducted. However, Part-B will contain a new question and Part-B will have higher weightage than part-A or full weightage could even be allotted for Part-B in such an event.

- b) **T2:** Immediately follows T1. Students in a specified batch who now have received the same question during T1 will work further on that problem for T2.

T2 is primarily an extension of problem received in T1 for carrying out validation study: Case studies / Simulations. Each batch shall interact with the course instructor to finalize the nature of validation and expected to complete the exercise within 10 to 15 days after T1.

Course instructor should ensure assigning a different case study / a different scope for validation study for each batch in case the same problem is assigned to two batches.

Course instructor shall assess every student in a batch for a max. of 10 marks based on his observation, interaction and / or reviewing. (based on at least two reviews)

- c) **T3:** T3 shall be conducted during the last week of each module. Student batches are expected to submit a report, clearly documenting the work executed during T2. The report should be in IEEE / APA format and additionally a voice in-built PPT should be prepared and submitted.

The report and presentation shall be assessed by the course instructor for 10 marks for every student. In certain cases, a course instructor can call for a physical presentation also by a batch.

- d) **T4:** T4 is a comprehensive module test, conducted for 30 min. comprising of 20 multiple choice questions (MCQs) covering the holistic content of module. T4 shall be evaluated for a max. of 10 marks @ ½ mark for each question. T4 will be conducted in ON-LINE mode

There shall be two tests in each course in a day and the best performance of the tests shall be considered for awarding the marks.

Two sets of question papers each containing 20 questions should be set. The theme of the questions could be similar across the sets. When the test is administered online,

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every student receives the questions in shuffled sequence and also the choices in shuffled sequence. Therefore, the choice like both 'a' and 'b' above, Neither of 'a' and 'b', all the three a, b, c will not be set.

- e) **T5:** T5 assessment is based on Practice or Tutorial assignments. Implementation, Report presentation and Discussion shall happen in a continuous mode throughout the module period.

At least 4 such continuous practice assessments (CPA) / assignments per module shall be conducted by course instructor. The marks will be @ 5 marks per assignment totaling up to 20 per module.

The scores of the tests are to be normally announced within three working days on completion of the assessment and the performance is to be discussed in the class.

- f) The total marks per module is 60 - T1 (out of 10), T2 (out of 10), T3 (out of 10), T4 (out of 10) and T5 (out of 20).
- g) Total marks for both the modules from formative assessment will be added up to 120, which will be **suitably mapped down** to a max. of 60 marks. The mapping policy should be decided by the lead instructor / instructors in consultation with the HoD. The mapping policy should be shared with Dean AAA for the purpose of documentation.
- h) The marks scored in Module-1 for a max. of 60 should be entered / submitted latest by 9th week and of Module-2 latest by 17th week of the semester. Consolidated score of for a max. of 120 **suitably mapped down** to a max. of 60 marks should be submitted latest by 18th week of semester enabling the declaration of 'R'- grade before the commencement of summative assessment.
- i) A candidate put under 'R' will not be permitted to take up the summative assessment.

5.3.2 Summative Assessment

- a) An instructor may choose one of the two formats for conducting summative assessment for L-based courses integrated with T / P
- 15 + 25 marks format or 20 + 20 marks format (following b, c, d below)
 - 40 marks format (following c, d below)
- b) **If summative assessment is in two parts format:**
- Part-I will be the assessment of capstone project which is pre-assigned during the module-2 period or will be the exploratory review assessment of all practice assignments.
 - Part-II will be based on a written examination for a max. marks of 80, as in c and d below, which is **scaled down** to 25 or 20 based on the selected pattern of format.
 - A candidate should attend both the parts of summative assessments; else he will be put into I grade.
- c) For each L-based course integrated with T / P, the summative assessment shall be conducted by the Institute for a duration of 150 min. and for a maximum of 80 marks. Contents for summative assessment shall cover the breadth and depth of the complete syllabus that is mentioned in the two modules of a course.
- d) The question paper for end-semester theory examination consists of two parts as given in Table (2).

Table 2: Theory Examination Question Paper Pattern.

| Part No. | No. of Questions | Marks for each Question | Marks | Choice |
|--------------------|------------------|-------------------------|-----------|--------|
| A | 4 | 10 | 40 | No |
| B | 2 | 20 | 40 | No |
| Total Marks | | | 80 | |

- e) The questions will be comprehensive covering the entire course syllabus and any single question should not necessarily be limited to any particular unit / module.



- f) These marks are **suitably mapped down** to a score of 40.
- g) Total marks of summative assessment will be for a max. of 40 irrespective of format of evaluation.
- h) The award of 'I' grade is solely based on marks scored in summative assessment out of 40, if he / she does not score a min. 14 out of 40 (35%).

5.4 P-based Courses

The detailed information consisting of list of practices, batch formations, schedules, etc., will be displayed / informed to the student in the first week of the semester so that the student come prepared for the Practical sessions.

5.4.1 Formative Assessment

During Practical sessions, a brief viva-voce is conducted for each student on the practice problem he / she is carrying out on that day. Some of the parameters that could be included in the Continuous Practice Assessment (CPA) are given in Table (3). The set of parameters may slightly differ from one practice to the other, and will be announced before the commencement of the practice session. These parameters are assessed for each practice session.

Table 3: Suggested parameters for Continuous Practice Assessment (CPA)

| S. No | Component | Marks |
|--------------|---|-----------|
| 1 | Report of about one page on proposed computational procedure and background theory before the start of practice session | 4 |
| 2 | Viva and interaction to evaluate understanding of concepts | 4 |
| 3 | Data collection and computation | 4 |
| 4 | Analysis of data and interpretation | 4 |
| 5 | Finalized report submitted on the next week | 4 |
| Total | | 20 |

This assessment is carried out for each practice session and the total marks of all Practical sessions will be **suitably mapped down** to a max. of 60.

5.4.2 Summative Assessment

End semester examination for each practice course is conducted jointly by two examiners. The examiners are appointed by Dean, AAA from the panel of examiners suggested by the respective Heads of the Department. In some cases, one of the examiner may be from outside the institution and will be identified as external examiner. The scheme of assessment may vary depending on the nature of practice, which shall be shared with student by the faculty in-charge. The summative assessment will be conducted for a max. marks of 40. The general scheme of assessment is given in Table (4).

Table 4: Suggested summative assessment pattern for P-based courses

| Component | Marks | | |
|---|------------|------------|-----------|
| | Examiner 1 | Examiner 2 | Total |
| Objective and Procedure write up including outcomes | 4 | 4 | 08 |
| Data collection and computation | 4 | 4 | 08 |
| Computation of results | 4 | 4 | 08 |
| Analysis of results and interpretation | 4 | 4 | 08 |
| Viva Voce | 0 | 8 | 08 |
| Total Marks | 16 | 24 | 40 |

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5.5 Assessment and Grading of MOOCs based elective

Whenever a candidate opts for a course through MOOCs offered via Swayam platform, he / she has to learn and undergo assessment as per Swayam norms. Upon the declaration by Swayam, that the candidate has successfully completed the course, the candidate is said to have earned the credits under credit equivalence and credit transfer.

5.6 Project

The students will carry out their project work in any one of the triple major courses of his / her interest at VFSTR and submit their report which is a mandatory requirement for the award of degree. These projects are usually done in groups (not exceeding four students in a group), during the VI semester, under the guidance of a faculty member. Every batch, in consultation with the supervisor, should define the project and also the probable procedure of carrying it out and submit the same to a committee consisting of 2 to 3 faculty members appointed by Head of the Department. This is to avoid the repetition and also to come up with a roadmap for completion of the project within the time stipulated. The students are encouraged to select topics related to ongoing research and consultancy projects. The students are expected to carry out and present a survey of literature on the topic, work out a project plan and its implementation through computation / modelling / simulation. They are also expected to exhibit system analysis, design, presentation and evaluation skills. The entire process of grouping of student batches, and identification of respective faculty supervisor etc., is to be completed by the end of V semester, so that students can start of their project work immediately after V semester.

5.6.1 Formative Assessment

The progress of project is reviewed twice in a module by the Project Review Committee (PRC) and formative assessment marks are awarded based on these reviews. The Project review committee consists of

- a) Head of Department or his / her nominee – Chairperson
- b) A senior faculty member identified by the HoD – member
- c) Project supervisor – member

Review schedules of PRC are to be announced by the department immediately after the commencement of class work. The review presentations are open to all the students of that section and attendance is compulsory. The first review should be of 15 minutes per batch; the remaining reviews should be around 30 minutes per batch. Before every review the batches should submit their PPT along with a brief report of not exceeding two pages. It is to be expected by the committee that student presents a research article in national / international conferences based on the project work prior to graduation. The following aspects may be considered by the committee for assessment Table (5).



**Table 5:** Schedule and suggested parameters to be considered for formative assessment.

| Module | Schedule | Review number | Points to be considered | Max. Marks |
|-----------|-----------|---------------|---|------------|
| Module -1 | 4th week | First review | <ul style="list-style-type: none"> • Identification of specific area out of broad areas. • Identification of outcomes in line with programme objectives • Feasibility of contributing to the attainment of outcomes | 15 |
| | 8th week | Second review | <ul style="list-style-type: none"> • Identification of software / tools requirements and training needs. • Understanding by individual students on the overall aspect of the project • Completion of literature survey • Design of project set up | 15 |
| Module -2 | 12th week | Third review | <ul style="list-style-type: none"> • Data Acquisition / learning of the tool / methods required • Readiness of the layout of the project report • Progress review as per mechanism/ schedule identified • Individual student contribution in above activities. | 15 |
| | 16th week | Fourth review | <ul style="list-style-type: none"> • Presentation of results and conclusions • Meeting of objectives defined in first review • Submission of draft report • Understanding by individual students on the overall project • Individual student contribution • Progress of project as per schedule | 15 |

5.6.2 Summative Assessment

At the end of the semester, during 18th to 20th week of the semester the summative assessment will be conducted in two phases

Phase –I (during 18th -19th week): this is an evaluation for a max of 20 marks. A committee of two members comprising of HoD's nominee and supervisor will assess the project work which will involve going through the project report (6 marks), project presentation (7 marks) and demonstration of the project (7 marks).

Phase –II (during 20th week): A final presentation and defense assessment for a max. of 20 marks will be carried out by one-man committee composed of an external expert who is chosen by the Dean AAA from a panel of examiners suggested by the HoD. The format for evaluation will involve going through the project report's quality (6 marks), presentation (6 marks) and interaction and defense (8 marks).

The qualifying marks will be finalized considering the marks scored in both the phases (I and II) of summative assessment.

In case the candidate is placed in 'I' grade, he / she has to take both Phase-I and Phase-II assessments, which will be held within the 15 days after declaration of results. In the consecutive assessment also if the candidate fails to secure minimum required score then he / she will be placed in 'R' grade.

6 SEMESTER-END ASSESSMENT ACTIVITIES

Setting of summative assessment question papers will be coordinated by the lead instructor assigned for a particular course. Two sets of question papers will be submitted latest by 12th week of the semester.



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- 6.1** There shall be 'Summative Assessment Question Paper Scrutiny Committee' which would be constituted with external experts. Experts are empowered to modify / rephrase the questions to maintain a high standard of the semester-end assessment. The review should be completed by the 14th week of the semester. The review process will be coordinated by a committee of School Dean, HoDs and external experts.
- 6.2** The question wise marks scored in the summative assessment out of a total of 80 will be made available online within two weeks from the last date of examination and would be kept active for 24 hours. Latest by the end of 48 hours from the instant of notification any candidate can submit an appeal online providing question wise claim.
- 6.3** Claims for re-assessment on P-based courses are not allowed.
- 6.4** The appeals will be attended within next three working days. Fees for appeal, as decided from time to time, have to be remitted online along with the appeal.
- 6.5** Final results and grades will be computed as explained in the next section
- 6.6** Final results and grades shall be announced within four weeks of completion of the last examination of the summative assessment (within two weeks from the last date of appeal). Grades are published on the University website, and also informed to the parents and students through SMS.
- 6.7** Provisional Grade cards will be issued within two weeks after the announcement of grades. Grade card will contain three parts. Part 1: details of successfully completed courses. Part 2: Details of 'I' grade courses. Part 3: Details of 'R' grade courses

7. COMPUTATION OF GRADING

- 7.1** Formative assessment decides the list of 'R'- candidates. Therefore, these candidates will not be considered for grading computation. Summative assessments decide the list of 'I' candidates. Therefore, these candidates will not be considered for grading computation
- 7.2** The candidates who have successfully completed both formative and summative assessments will be considered for computation of relative grading.
- 7.3** Threshold value (**Th**) for relative grading in each course is arrived after studying the marks distribution in that course by the committee constituted by Dean, AAA. The threshold value is decided by the upper bound marks of the major chunk of the class keeping the top outlier scores away from consideration (the least upper bound). The threshold value will be slightly greater than upper bound marks or may be equal to the upper bound marks.
- 7.4** The total marks (**m**) = marks scored in the formative assessment + marks scored in the summative assessment is transformed into relative grade expressed accurate to two decimal places as follows:

$$\text{Relative grade point (P)} = (m / Th) \times 10 \text{ [and limited to 10]}$$

- 7.5** If students require course wise percentage equivalence, then the calculation will be based on the following:

$$\text{Course wise percentage equivalence} = (m / Th) \times 100 \\ \text{[truncated to two-digit integer and limited to 100]}$$

- 7.6** After relative grading, a student is assigned a 'Letter Grade (G)' for each course as per Table (6). The grade and the corresponding letter grade represent the outcomes and assessments of a student's performance in a course.



Table 6: Grading information

| Relative Grading Range (P) | Category | Grade (G) |
|----------------------------|-------------|-----------|
| ≥ 9.50 | Outstanding | O |
| ≥ 8.50 to 9.49 | Excellent | S |
| ≥ 7.00 to 8.49 | Very good | A |
| ≥ 6.00 to 6.99 | Good | B |
| ≥ 5.00 to 5.99 | Fair | C |
| ≥ 4.00 to 4.99 | Marginal | M |
| Transitional Grade | Repeat | R |
| Transitional Grade | Incomplete | I |

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8. SUPPLEMENTARY EXAMINATIONS

- 8.1** The supplementary examinations shall be conducted once in summer semester. Notifications will be released by the examination section informing the students about registration procedures, details of fee and timetables. Apart from these examinations the students who have courses with 'I'-grade can also write the supplementary examinations along with regular semester-end examinations of that academic (Odd / Even) semester.
- 8.2** Whenever a candidate clears courses with 'I' grade in a supplementary examination that are conducted during a regular semester, the Threshold value for computing his / her grade will be obtained from the same batch in which he / she had completed his / her formative assessment.
- 8.3** Whenever a candidate clears courses with 'R' / 'I' grade in a summer semester, the Threshold value for computing his / her grade will be carry forwarded from the preceding Odd / Even semester for the respective courses.
- 8.4** Whenever a candidate clears courses with a 'R' grade in a regular semester along with his / her junior batch then for this candidate the Threshold value will be corresponding to his / her junior batch for computing grade.
- 8.5** The results of summative assessment of Project / Internship will be announced only if the candidate successfully earn all the credits in courses registered during the program. If the candidate is with 'R' / 'I' graded courses the results will be kept under '**Announced Later (L)**' status and will be announced only after candidate clears these courses.

9. GRADE POINT AVERAGE

The Academic Performance of a student is indicated every semester by the Semester Grade Point Average (SGPA) and finally by Cumulative Grade Point Average (CGPA).

9.1 SGPA

The Semester Grade Point Average (SGPA) shall be computed using the formula given below:

$$SGPA = \frac{\sum_{i=1}^n C_i P_i}{\sum_{i=1}^n C_i}$$

Where

n = number of courses a student successfully completed in the semester under consideration

P_i = Grade points secured for the i^{th} course registered in the semester under consideration.

C_i = the number of credits assigned to i^{th} course registered in the semester under consideration.

9.2 CGPA

The Cumulative Grade Point Average (CGPA) shall be computed after successful completion of the programme. The CGPA shall be expressed in

B. Sc. accordingly, the computations will be as below:

$$CGPA = \frac{\sum_{j=1}^m C_j P_j}{\sum_{j=1}^m C_j}$$



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where

m = total number of courses prescribed for the completion of the programme

C_j = the number of credits assigned to the jth courseP_j = grade points secured in the jth course and $\sum C_j = 120$ **Percentage equivalence of SGPA and CGPA = (SGPA or CGPA) × 10****10. AWARD OF CLASS**

The students who have become eligible for award of degree shall be classified based on their CGPA secured, as per the Table (7) given below:

Table 7: Class / Division Information

| Sl. No. | CGPA | Class / Division |
|---------|---------------------------------|------------------------------|
| 1 | 7.0 and above | First Class with Distinction |
| 2 | 6.0 and above but less than 7.0 | First Class |
| 3 | 5.0 and above but less than 6.0 | Second Class |
| 4 | 4.0 and above but less than 5.0 | Pass Class |
| 5 | Less than 4.0 | Incomplete |

- For the purpose of rewarding the accomplishers with ranks and awards, toppers are identified based on their academic performance (CGPA) in B. Sc.
- In addition, the 'Chairman's gold medal' and other 'Endowment Awards' are awarded to the 'outstanding students' based on the overall performance which includes academic, co-curricular and extra-curricular activities, campus placements and competitive examinations. A committee appointed by the Vice-Chancellor will recommend the eligible student for the award, selected from the nominations received from the departments.
- In addition, the institution may recognize exceptional performance such as music, dance, sports etc. and display of exceptional bravery from time to time.
- The candidates who complete 120 credits in the first 6 successive semesters shall be eligible to receive awards / ranks in B.Sc.
- The candidates availing spillover semesters will not be eligible for the award of merit scholarships.

11. AWARD OF DEGREE

On successful completion of prescribed requirements of the programme, the degree shall be conferred during the convocation of the VFSTR.

For the conferment of degree, the student has to fulfill the following requirements:

- a bonafide student undergone the B.Sc. course work of not less than three academic years and not more than five academic years from the date of joining.
- successfully completed all the courses as prescribed in the respective curriculum.
- acquired a minimum eligible credits i.e. 120 credits for the award of B. Sc. degree.
- obtained no due certificates as prescribed by VFSTR.
- no disciplinary proceedings pending against him / her

Consequent upon being convinced, following an enquiry, the Academic council may resolve to withdraw the degree / diploma / any other certification provided by the institute. The aggrieved may however prefer for a review of such decision by the Academic Council, citing cogent reasons for review or go in for an appeal to the, BoM of the institute

12. LATERAL EXIT OPTIONS**12.1 Honorable exit with suitable Certificate or Diploma**

In line with NEP-2020, an optional exit is provided for a candidate at the end of 2nd semester and 4th Semester of B.Sc.

An Undergraduate Certification will be awarded in Mathematics, Statistics and Computer Science provided the candidate has earned min. of 40 credits and completed two semester of study.

An Undergraduate Diploma will be awarded in Mathematics, Statistics and Computer Science provided the candidate has earned min. of 80 credits and completed 4 semester of study.

| Year(Sem) | Year(Sem) | Year(Sem) | Year(Sem) |
|--|-----------|--|-----------|
| 1(1) | 1(2) | 2(1) | 2(2) |
| EXIT 1: Minimum 40 CREDITS Under graduate certificate in Science | | EXIT 2: Minimum 80 CREDITS Under graduate Diploma in Science | |

Figure 5: Lateral Exit Options

In case the candidate fails to earn minimum credits within the spillover period, a suitable certification will be awarded during his / her exit from B.Sc. degree.

Semester-wise transcript and a consolidated transcript will be given to the candidates during their exit from the registered program. Such a candidate who has exited can seek re-entry to complete B.Sc. by surrendering the UG certification / UG Diploma. A committee constituted by Vice-Chancellor will scrutiny all such re-entry requests and recommend the plan of action. However, the maximum programme duration for B.Sc. should be limited to five years, whereas for onward continuation to M.Sc., with two additional years as spillover, the maximum duration is limited to four years and further extension beyond the stipulated maximum duration of study has to be approved by Academic Council, if the candidate appeals for an extension.

12.2 Volunteer 'Drop' with Sabbatical Semester option

A candidate may exercise his option to voluntarily exit from B.Sc. Programme temporarily for a semester during the B.Sc. Programme, by registering for a 'DROP option' in the beginning of the semester. The drop can be exercised to take up special internship / innovation / exploratory / entrepreneurship / advanced research / start-up and such related activities. Under such circumstances a candidate can normally avail drop over two successive semesters. Such 'drop' semester will be identified as sabbatical semesters.

Such a candidate has to pay the regular semester fee if such a drop option is utilized during the first 6 semesters of B.Sc., and has to pay a nominal semester maintenance fee during the spillover period, if a candidate has not yet completed the credit requirements.

Upon returning from such a temporary exit, a candidate may continue his B.Sc. studies utilizing the provision of spillover period. A candidate may also submit a claim for credit equivalence for the activities undertaken during the drop period. The equivalence committee would evaluate and assess the academic equivalence of the work carried out and would recommend the credit equivalence and credit transfer to be granted together with the grades that could be attributed, if applicable. However, the maximum duration of programme should be limited to five years and further extension beyond the stipulated maximum duration of study has to be approved by academic council, if the candidate appeals for an extension.

12.3 Volunteer 'Drop' with Semester Drop option

A candidate may exercise his option to voluntarily exit from B.Sc. programme temporarily for a semester during the B.Sc. programme, by registering for a 'DROP option' in the beginning of the semester to meet the family / personal exigencies. All the norms as mentioned in the above section (12.2) shall be applicable for the candidates utilizing semester drop option.

13. INTERPRETATION OF RULES

- The academic rules and regulations should be read as a whole for the purpose of any interpretation.
- For the matter(s) NOT covered herein above or for unforeseen circumstances, but arising during the course of the implementation of the above regulations. The Vice-Chancellor shall be authorized to remove the difficulties and decide upon the matters. The same shall be reported in the next meeting of Academic Council for ratification and subsequently informed to BoM.
- The Institution may change or amend the academic rules and regulations or curriculum at any time, and the changes or amendments made shall be applicable to all the students with effect from the dates, notified by the Institution.
- Procedure and explanation to any section can be floated by the office of Dean AAA as applicable from time to time with due approval by the chairperson of Academic Council.

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ANNEXURE -1
B.Sc. COURSE STRUCTURE (R22)

I Year I Semester

| Course Code | Course Title | L | T | P | C |
|-------------|--|--------------|----------|-----------|-----------|
| 22BS101 | Technical English Communication | 2 | 2 | 2 | 4 |
| 22BS102 | Calculus | 3 | 2 | - | 4 |
| 22BS103 | Descriptive Statistics and Probability Distributions | 3 | - | 2 | 4 |
| 22BS104 | Programming in C | 2 | - | 4 | 4 |
| 22BS105 | IT Workshop | - | 2 | 4 | 3 |
| 22BS106 | Sports / Physical fitness / Games | - | - | 3 | 1 |
| | Total | 10 | 6 | 15 | 20 |
| | | 31 hr | | | |

I year I / II Semester

| Course Code | Course Title | L | T | P | C |
|-------------|---------------------|---|---|---|---|
| 22BS112 | Orientation Session | - | - | 6 | 3 |

I year II Semester

| Course Code | Course Title | L | T | P | C |
|-------------|--|--------------|----------|----------|-----------|
| 22BS107 | Digital Logic and Computer Organizaion | 3 | - | 2 | 4 |
| 22BS108 | Algebra | 3 | 2 | - | 4 |
| 22BS109 | Mathematical Expectation and Probability Distributions | 3 | - | 2 | 4 |
| 22BS110 | Data Structures | 2 | 2 | 2 | 4 |
| 22BS111 | Sports / Physical fitness / Games | - | - | 3 | 1 |
| | Total | 11 | 4 | 9 | 17 |
| | | 25 hr | | | |

II year I Semester

| Course Code | Course Title | L | T | P | C |
|-------------|--|--------------|----------|-----------|-----------|
| 22BS201 | English Proficiency and Communication skills | - | 2 | 2 | 2 |
| 22BS202 | Discrete Mathematical structures | 3 | 2 | - | 4 |
| 22BS203 | Statistical Methods | 3 | - | 2 | 4 |
| 22BS204 | Database Management Systems | 3 | - | 2 | 4 |
| 22BS205 | Object Oriented Programming | 3 | - | 2 | 4 |
| 22BS206 | Environmental Science | - | 1 | 1 | 1 |
| 22BS207 | NCC / NSS / SAC / Paper presentation / Social Activities | - | - | 2 | - |
| | Total | 12 | 5 | 11 | 19 |
| | | 28 hr | | | |



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II year II Semester

| Course Code | Course Title | L | T | P | C |
|-------------|--|--------------|----------|-----------|-----------|
| 22BS208 | Business English Communication – I | - | 2 | 2 | 2 |
| 22BS209 | Business English Communication (BEC) II | - | 2 | 2 | 2 |
| 22BS210 | Differential Equations | 3 | 2 | - | 4 |
| 22BS211 | Statistical Inference | 3 | - | 2 | 4 |
| 22BS212 | Operating Systems | 3 | - | 2 | 4 |
| 22BS213 | Design and analysis of algorithms | 3 | - | 2 | 4 |
| 22BS214 | NCC / NSS / SAC / Paper presentation / Social Activities | - | - | 2 | 1 |
| | Total | 12 | 6 | 12 | 21 |
| | | 30 hr | | | |

III year I Semester

| Course Code | Course Title | L | T | P | C |
|-------------|----------------------|--------------|-----------|----------|-----------|
| 22BS301 | Linear Algebra | 3 | 2 | - | 4 |
| 22BS302 | Real Analysis | 3 | 2 | - | 4 |
| 22BS303 | Sampling Techniques | 3 | - | 2 | 4 |
| 22BS304 | Econometrics | 2 | 2 | - | 3 |
| 22BS305 | Computer Networks | 3 | - | 2 | 4 |
| 22BS306 | Cyber Security | 2 | 2 | - | 3 |
| 22BS307 | Software Engineering | 2 | 2 | - | 3 |
| | Total | 18 | 10 | 4 | 25 |
| | | 32 hr | | | |

III year II Semester

| Course Code | Course Title | L | T | P | C |
|-------------|-----------------------|--------------|----------|----------|-----------|
| | *Mathematics Elective | 3 | 2 | - | 4 |
| | *Statistics Elective | 3 | 2 | - | 4 |
| | *Computer Elective | 3 | - | 2 | 4 |
| 22BS308 | Project | - | 2 | 6 | 4 |
| | Total | 9 | 6 | 8 | 16 |
| | | 23 hr | | | |

* Candidate can also acquire a maximum of 4 credits through MOOCS (Swayam Based NPTEL) which can be considered equivalent to one of the electives.



R22 B.Sc.,

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List of Department Elective Courses

| Course Code | Course Title | L | T | P | C |
|-------------------------|--------------------------------------|---|---|---|---|
| MATHEMATICS | | | | | |
| 22BS801 | Analytical Geometry | 3 | 2 | - | 4 |
| 22BS802 | Graph Theory | 3 | 2 | - | 4 |
| 22BS803 | Numerical Analysis | 3 | 2 | - | 4 |
| 22BS804 | Complex Analysis | 3 | 2 | - | 4 |
| 22BS805 | Number Theory | 3 | 2 | - | 4 |
| 22BS806 | Integral Transforms | 3 | 2 | - | 4 |
| STATISTICS | | | | | |
| 22BS811 | Design of Experiments | 3 | 2 | - | 4 |
| 22BS812 | Statistical analysis through SPSS/R | 2 | - | 4 | 4 |
| 22BS813 | Advanced Probability | 3 | 2 | - | 4 |
| 22BS814 | Operations Research | 3 | 2 | - | 4 |
| 22BS815 | Applied Statistics | 3 | - | 2 | 4 |
| COMPUTER SCIENCE | | | | | |
| 22BS821 | Formal Languages and Automata Theory | 3 | 2 | - | 4 |
| 22BS822 | Machine Learning | 3 | - | 2 | 4 |
| 22BS823 | Web Technologies | 2 | - | 4 | 4 |
| 22BS824 | Python Programming | 2 | 2 | 2 | 4 |



ANNEXURE – 2

**SUPPLEMENT REGULATION FOR
PURSUING B.Sc + M.Sc DEGREE**

**R22 B.Sc.,
3 YEAR**

**DEGREE
PROGRAMME**



The proposal to institute M.Sc. in line with the practices in Institutions of National Importance, is to elevate the Gross Qualification Index (GQI) of India, and specifically to enhance the managerial competency of the graduates.

In order to attract the committed learners towards earning M.Sc. immediately after B.Sc. the following scheme is proposed:

1. He / she should be a candidate maintaining his / her studentship through proper registration process of B.Sc. program and fulfills all the credit requirements of B.Sc.
2. He / she has to appear for an aptitude test / interaction and the corresponding committee of experts constituted for the purpose has to recommended his / her name.
3. The study pattern will be as follows:

| M. Sc. Semester Count | Credits | Expected Study Coverage |
|-----------------------|---------|---|
| I / I | 24 | Professional Core |
| I / II | 24 | <ul style="list-style-type: none"> ● 20 credits of Professional Core and Electives ● MOOCS 4 credit |
| II / I | 20 | <ul style="list-style-type: none"> ● 16 credit Professional Core and Electives ● MOOCS 4 credit |
| II / II | 12 | <ul style="list-style-type: none"> ● 12 credits for Project |

4. The candidate should earn all the credits of the B.Sc. program before commencing the M.Sc. program. The program structure designed for M.Sc. will be followed from VII semester onwards, which will precisely corresponds to I semester of M.Sc. and onwards.
 - B.Sc. degree = 120 credits
 - M.Sc. degree = 80 credits
5. Honourable exit option:
 - Candidate who has earned all the credit requirements till first year (48 credits) of M.Sc. can exercise his / her option to exit the program with a B.Sc. honours degree provided he / she has fulfilled the credits requirement of B.Sc. as prescribed by VFSTR.
 - However, candidates with B.Sc. degree from other institutes, opt to exit at the end of 2nd semester of M.Sc., will be awarded PG diploma provided he / she fulfills the credit requirements till the end of 2nd semester.



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Annexure – 3

INTER – INSTITUTE CREDIT TRANSFER

Students pursuing an undergraduate programme in other recognized Higher Education Institute (HEI) could be admitted into VFSTR without appearing for the entrance exam to continue their studies, subject to the approval by a committee constituted by Vice-Chancellor. In this case, the student shall furnish the transcripts or grade cards, syllabus copies, educational certificates, and other relevant documents while applying for admission. The committee constituted by Vice-Chancellor, will establish the equivalency based on the marks / credits obtained in the courses in the previous institute by following the admission policy as mentioned below.

PROCEDURE

- Admissions are only at the beginning of an academic year and depend on availability of vacancies in the respective program.
- The courses studied by the candidates elsewhere will be mapped with the courses offered by VFSTR and the committee may suggest for study of additional courses for maintaining credit equivalency or for satisfying pre-requisites. The committee may also recommend the plan of study for the courses identified.
- After admission, the student has to submit the following documents
- Transfer Certificate
- Grade card / Marks Memo
- "No objection certificate (NOC)" from the concerned Institute / University where the candidate completed part of the programme.
- Provisional admission of the candidates will be confirmed only after verification of the authenticity of the certificates from the concerned authorities.
- Min. 50% of the credits have to be earned at VFSTR.
- Courses which are completed by the candidate in the previous institute will be transferred as recommended by the equivalence committee under credit cum grade transfer. Inclusive these credits the candidate has to complete the credit requirements as per VFSTR.
- Consolidated grade card / transcript will clearly show the credits under credit transfer and corresponding CGPA and credits earned in VFSTR and corresponding CGPA. Over all CGPA may also be indicated.

EXTENSION:

VFSTR candidates may also be permitted to earn credits up to max of 20% by the way of credit transfer from taking up the courses from other institutes of repute.

