University of Mumbai

CIRCULAR:-

Attention of the Principals of the Affiliated Colleges, the Head of the University Departments and Directors of the recognized Institutions in Science & Technology Faculty is invited to this office circular No. UG/89 of 2012-13 dated 8th November, 2012 relating to the Manual with Regulation Nos. 8571, 8572, 8573, 8574, 8575, 8576, 8577, 8578, 8579, 8580, 8581, 8582 and 8583 for Master Computer Applications (M.C.A.) as per CBSGS under Faculty of Technology.

They are hereby informed that the recommendations made by the Board of Studies in Computer Applications at its meeting held on 1st December, 2018, have been accepted by the Academic Council at its meeting held on 26th December, 2018 **vide** item No. 4.12 and that in accordance therewith, the Manual for Equivalance Rules for Transfer of students from Credit Based Semester and Grading System (CBSGS) to Choice Based Credit System (CBCS) in Master of Computer Application (M.C.A.) has been brought into force with effect from the academic year 2016-17, accordingly. (The same is available on the University's website www.mu.ac.in).

MUMBAI – 400 032
14th May, 2019
To

(Dr. Ajay Deshmukh)
REGISTRAR

The Principals of the affiliated Colleges and Directors of the recognized Institutions in Science & Technology Faculty. (Circular No. UG/334 of 2017-18 dated 9th January, 2018.)

A.C/4.12/26/12/2018

****

No. UG/ 13 -A of 2019-20   MUMBAI-400 032   14th May, 2019

Copy forwarded with Compliments for information to:-

1) The I/c Dean, Faculty of Science & Technology,
2) The Chairman, Board of Studies in Computer Applications,
3) The Director, Board of Examinations and Evaluation,
4) The Professor-cum-Director, Institute of Distance and Open Learning (IDOL),
5) The Director, Board of Students Development,
6) The Co-ordinator, University Computerization Centre,

(Dr. Ajay Deshmukh)
REGISTRAR

UNIVERSITY OF MUMBAI

Manual on

CHOICE BASED CREDIT SYSTEM

for

Postgraduate Program

M. C. A.

(Master of Computer Application)

under

FACULTY OF TECHNOLOGY (with effect from the academic year 2016-17)

1 Introduction

1.1 Recommendations of National Regulatory Authorities

The University Grants Commission (UGC), the **National Assessment andAccreditation Council (NAAC),** the **Distance Education Council (DEC)** and even the**National Knowledge Commission (NKC)** have time and again come out with recommendations for improving thequality and effectiveness of Higher education provisions in the country. The ministry of Human Resource Development at the Central level and the Ministry of Higher & Technical Education, Govt. of Maharashtra have also repeatedly stressed on the need for universities to pay prompt attention to improve the quality of education.

An important concern voiced more strongly in recent times, is the need to develop a Choice-Based Credit System (CBCS) in tune with global trends and the adoption of a sound grading system for reflecting learner performance. To quote Shri S. K. Tripathi, former Secretary, Dept. of Secondary and Higher Education, Ministry of Human Resource Development, Govt. of India, "...... *The demand for socially relevant, economically productive, globally competitive, culturallysustaining and individually satisfying programmes that cater to the needs of the present times is fast growing. The constraints of pursuing programmes and participation in pre-determined combination of Courses pose rigidities not in keeping with the demands of the changing times….*
There is a need for a fully convertible credit-based system acceptable to other universities.

Recommendation of the UGC in its*Action Plan for Academic and Administrative Reforms* (Ref. UGC letters January 2008; March 2009) "……. *Curricular flexibility and learners'mobility is an issue that warrants our urgent attention. These can be addressed by introducing credit based courses and credit accumulation. In order to provide with some degree of flexibility to learners, we need to provide flexibility in course selection and also a minimum as well as a maximum permissible span of time in which a course can be completed by a learner… The Choice-Based Credit System (CBCS) imminently fits into the emerging socioeconomic milieu, and could effectively respond to the educational and occupational aspirations of the upcoming generations. In view of this, institutions of higher education in India would do well to invest thought and resources into introducing CBCS. Aided by modern communication and information technology, CBCS has a high probability to be operationalised efficiently and effectively — elevating learners, institutions and higher education system in the country to newer heights…".*

The **National Knowledge Commission (NKC)** under the chairmanship of Mr. Sam Pitroda, inits report to the Prime Minister on 29th November 2006) has also reiterated the importance of higher education and the contribution it has made to economic development, social progress and political democracy in independent India. However, the Commission has also pointed out to a "serious cause for concern" at this juncture. According to Mr. Pitroda, " *….it is important for usto recognize that there is a quiet crisis in higher education in India which runs deep. And the time has come to address this crisis in a systematic, forthright manner. …. There is a need for a transition to a course credit system where degrees are granted on the basis of completing a requisite number of credits from different courses, which provides learners with choices….*

1.2 Rationale for introduction of Credit and Grading System

The UGC while outlining the several unique features of the Choice-Based Credit System (CBCS) has, in fact, given in a nutshell, the rationale for its introduction. Among the features highlighted by the UGC are: *Enhanced learning opportunities, ability to match learners'scholastic needs and aspirations, inter-institution transferability of learners (following the completion of a semester), part-completion of an academic programme in the institution of enrolment and part-completion in a specialized (and recognized) institution,improvement in educational quality and excellence, flexibility for working learners to complete the programme over an extended period of time, standardization and comparability of educational programmes across the country, etc.*

This credit and grading based system enables a much-required shift in focus from teacher-centric to learner-centric education since the workload estimated is based on the investment of time in learning, not in teaching. It also focuses on continuous evaluation which will enhance the quality of education. It can be concluded from the above discussion that it is very much essential to implement the credit and grading based higher education in India. University of Mumbai has taken a lead in implementing the system through its affiliated Institutes. In this regard it is very much essential to train and educate the faculty and staff in the new approach of education system for successful implementation. The essential information is made easily accessible through this manual. Course credit structure, examination/assessment and grading are mainly focused aspects of this manual and discussed in subsequent chapters.

2. COURSE CREDIT STRUCTURE – For Choice Based System

As the requirements for a particular degree (postgraduate), a certain quantum of academic work measured in terms of credits is laid down in general. Every semester by satisfactorily clearing courses/other academic activities a learner earns credits. The amount of credit associated with a course is dependent upon the number of hours of instructions per week in that course. Similarly the credit associated with any of the other activities is dependent upon the quantum of work expected to be put in for each of the other activity per week.

2.1 Credit Assignment

2.1.1 Theory and Laboratory Courses:

Courses are broadly classified as *Theory courses* and *Laboratory Courses.* Theory courses consist of lecture (**L**) and /or tutorial (**T**) hours, but may have attached practical (**P**) hours in special cases. Laboratory courses consist of practical hours, but may have attached tutorial hours in special cases. Credit (**C**) for a course is dependent on the number of hours of instructions per week in that course, and is obtained by using a multiplier of one (**1**) for lecture and tutorial hours, and a multiplier of half (**1/2**) for laboratory hours. Thus, for example, a theory course having **four** lectures and **one** tutorial per week throughout the semester carries a credit of **5**. Similarly, alaboratory course having **two** laboratory hours per week throughout semester carries acredit of **1**.

For example –

	Theory course					Laboratory course		
L	**T**	**P**	**C**		**L**	**T**	**P**	**C**
4	**1**	**0**	**5**		**0**	**0**	**2**	**1**

2.1.2 Seminars(Research Paper)

The program may prescribe Seminar as a requirement for the MCA. Seminar is a course where in under the guidance of a faculty member a learner is expected to do an in-depth study in a specialized area by doing survey of published technical literature, understanding different aspects of the problem. While doing this, the learner is expected to critically analyze works of various authors/researchers, learn the investigation methodologies, study concepts, techniques and the results presented in these papers, and present a seminar. It is mandatory to give a

seminarpresentation before a panel constituted for the purpose as mentioned in syllabus/curriculum manual of respective programme. Seminars typically carry **1 credit**.

2.1.3 Projects/ Presentations:

MCA Project:

A Project as a requirement for the MCA degree, wherein under the guidance of a faculty member, a group of not more than four learners in the sixth semester, is required to do some innovative work with the application of knowledge gained while learning various courses in the earlier years. The student is expected to do an exploratory work and study of latest methods and technologies, software engineering methodologies and project development practices used by IT and non – IT Industries. They work out a Project plan and carry it out through development cycles and experimentation and/or modeling / computation/ testing. Through the Project work the learner has to exhibit skills for design, analysis, coding, debugging, testing and synthesis.

These Projects will be offered as **Mini Project – I, Mini Project – II and Internship Project**

Mini Project – I and **II** are mini projects based on **open source technologies** assigned by the facultysupervisor / mentor; which student will do for **30 days (one month)** at the end of the **second semester and fourth semester respectively** from **1st June to 30th June** and its evaluation willbe done in the **third semester and fifth semester respectively**. It will **carry 2 credits each.**

Internship Project – is an **Internship project performed in Industry,** which student will do for **150 days (five months)** in the **sixth semester** from **1st January to 31st May**. It will carry **15 credits.**

2.2 Minimum Credit Requirements

The minimum credit required for award of a MCA degree is **152{ [Sem (I + II) (26+26=52)] +[Sem (III + IV) (28+28=56)] + [Sem (V + VI) (28 + 16 =44)] }**. This is normally divided into Theory courses, tutorials, laboratory courses, seminars and projects in duration of six semesters. The credits are distributed semester wise as shown in the structure and syllabus manual of the programme. Courses generally progress in sequences, building competencies and their positioning indicates certain academic maturity on the part of the learners. Learners are expected to follow the semester wise schedule of courses given in the syllabus manual of respective programmes.

2.3 Course/Subject codes

M. C. A. Programme: In the syllabus manual of the programme of MCA, subject code isassigned for each course. The subject code consists of six to seven digits. First two digits (letters) indicate the program of a particular discipline, next digit (letter) indicates course is either core/compulsory or elective or laboratory or seminar or Dissertation/Project. A fourth digit (number) indicates semester of a program and fifth and sixth digit (number) indicates serial number of course. A seventh digit (number) is only applicable for elective course which indicates the serial number of elective course in that group.

For example -

Core/compulsory course	Elective course	Laboratory course	Seminar	Dissertation
**C101	**E101	**L101	**S301	**D401

Where,

First two digit (letters)	**	: indicates program name (CA)
Third digit (letter)	C	: indicates Core/Compulsory course;
	E	: indicates Elective course
	L	: indicates laboratory course;
	S	: indicates Seminar
	D	: indicates Dissertation
Fourth digit (number) 1/3/4		: indicates semester in which that course to be studied
Fifth and sixth digit (numbers) 01		: indicates serial number of course
Seventh digit (number) 1/2/3/4		: indicates serial number of elective course in a group

3. EXAMINATION / ASSESSMENT AND GRADING

Semester wise performance assessment of every registered learner is to be carried out through various modes of examinations. These include Internal Assessment and End Semester Examination. Internal Assessment includes class tests, home assignments based on live problems, course projects either in a group or individually. The modes of evaluation and distribution of weightage for each of the assessments is given in the syllabus manual of the programme. Normally weightage of Internal Assessment and End Semester Examinationis 20 and 80 percentage respectively in theory courses. In laboratory courses continuous assessment should be carried out and appropriate weightage should be given to each practical/ assignment/ course project and proper record of the same to be preserved by the concerned faculty for the purpose of inspection as and when required.

3.1 Attendance

Attendance for all Theory, Tutorial, Practical, Seminar and Project/ Dissertation is compulsory. As per the University ordinance 119, 75% attendance is compulsory for keeping the term.

3.2 Modes of Assessment/Evaluation

3.2.1 Modes of Evaluation for Theory Courses

Various modes of assessment used for rating learners' performance in a theory course include Internal Assessment and End Semester Examination. Relative weightage for Internal Assessment is typically 20 percent. This will consist of two test out of which one is compulsory class test and another is either a class test or assignment on live problems or course project in a group/individually.

The end semester examination will be held as per the university schedule and the relative weightage for this would be 80 percent. It is normally of 3 hours duration and will cover the full syllabus of the course. **The end semester examination is mandatory.** The **grade** for **theorycourses** can be **awarded** only after **successfully completion** of both **Internal Assessment** and

End Semester Examination of the respective course as per the curriculum manual of the respective programme**.**

3.2.2 Modes of Evaluation for Laboratory Courses

The assessment in a laboratory course will be based on regular supervision of the learner's work, her/his performance in viva-voce examinations, the quality of their work as prescribed through laboratory journals and an end semester test that contains performing an experiment if practical examination is mentioned. It is obligatory to maintain a laboratory journalas prescribed by the course instructor. Final submission/examination for laboratory courses will normally be held before the end semester examination (final theory examinations). The **grade** for **laboratorycourses** can be awarded only after **successfully completion** of **Term Work, Practical and/or Oral** examination as per the curriculum manual of the programme.

3.2.3 Modes of Evaluation for Seminars

Seminars are evaluated based on a written report, and an oral presentation before a panel of examiners appointed by Head of Department/ Institute. The supervisor and/or co-supervisor, when involved, are part of the panel. The **grade** for **Seminar** can be awarded only after **successfully completion** of **Term Work** and **Oral Presentation** as per the curriculum manualof the programme. The evaluation of the seminars is completed before the commencement of the end semester examination.

3.2.4 Modes of Evaluation for Projects

 MCA Project: Mini Project I, Mini Project II and Internship Project- are separately graded. These projects are supervised or guided, and need regular interaction (at least once a week) with the supervisor/guide. Project group has to submit a project report and defend it in front of a panel of examiners. Panel of examiners for Mini Project I and Mini Project II evaluation will be appointed by Head of Department/Institute, while as for Internship Project and Research paper evaluation will be conducted by pair of Internal and External examiners appointed by University. The dates for submission of reports, the dates for presentations are to be scheduled as per the guidelines of University and details of mode of assessment are given in the curriculum manual of the programme. Project is a part of term work; the project report will not be accepted if students fail to complete the project successfully. The **grade** for **Project** can be awarded only after **successfully completion** of **Term Work** and **Oral Presentation** as per the curriculum manual of the programme.

3.3 Grading of Performance

Letter Grade and Grade Point Allocation

The choice based credit system will be effective from the academic year 2016-2017 for Faculty of Technology of University of Mumbai. In every course, based on the combined performance in all assessments in a particular semester as per the curriculum/syllabus, the student is awarded a letter grade. These letter grades not only indicate a qualitative assessment of the learner's performance but also carry a quantitative (numeric) equivalent called the Grade Point. The letter grades and their equivalent grade point applicable for **MCA** programm are given below:

A learner who remains **absent** in any form of **evaluation/examination, letter grade** allocated to him/her should be **AB** and corresponding **grade point** is **zero.** S/he should reappear for the said evaluation/examination in due course.

Percentage of Marks Obtained	Letter Grade	Grade Points	Performance
80.00 and above	O	10	Outstanding
75.00 – 79.99	A	9	Excellent
70.00 – 74.99	B	8	Very Good
60.00 – 69.99	C	7	Good
55.00 – 59.99	D	6	Fair
50.00 – 54.99	E	5	Average
45.00 – 49.99	P	4	Pass
Less than 45.00	F	0	Fail
Absent	AB	0	Fail

3.4 SGPI/ CGPI Calculation

3.4.1 Semester Grade Performance Index (SGPI)

The performance of a learner in a semester is indicated by a number called Semester Grade Performance Index (SGPI). The SGPI is the weighted average of the grade points obtained in all the courses by the learner during the semester. For example, if a learner passes five courses (Theory/labs./Projects/ Seminar etc.) in a semester with credits C_1, C_2, C_3, C_4 and C_5 and learners grade points in these courses are G_1, G_2, G_3, G_4 and G_5 respectively, then learners' SGPI is equal to:

$$SGPI = \frac{C_1 G_1 + C_2 G_2 + C_3 G_3 + C_4 G_4 + C_5 G_5}{C_1 + C_2 + C_3 + C_4 + C_5}$$

The SGPI is calculated to two decimal places. The SGPI for any semester will take into consideration the "*F* or *AB*" grade awarded in that semester. For example if a learner has failed in course 4, the SGPI will then be computed as:

$$SGPI = \frac{C_1 G_1 + C_2 G_2 + C_3 G_3 + C_4 * ZERO + C_5 G_5}{C_1 + C_2 + C_3 + C_4 + C_5}$$

3.4.2 Cumulative Grade Performance Index (CGPI)

An up to date assessment of the overall performance of a learner from the time s/he entered the University of Mumbai is obtained by calculating a number called the Cumulative Grade Performance Index (CGPI), in a manner similar to the calculation of SGPI. The CGPI therefore considers all the courses mentioned in the curriculum/syllabus manual, towards the minimum requirement of the degree learner have enrolled for. The CGPI is calculated at the end of every semester to two decimal places and is indicated in semester grade report cards.

The CGPI will reflect the **failed status** in case of **F grade(s),** till the course(s) is/are **passed**. When the **course(s)** is/are **passed** by obtaining a **pass grade** on subsequent examination(s) the **CGPI** will only reflect the **new grade** and not the **fail grades** earned earlier.

Example: Up to semester r a learner has registered for n courses, among which s/he has "F" grade in i^{th} course. The semester gradereport at the end of semester r therefore willcontain a SGPI calculated as:

$$CGPI = \frac{C_1 G_1 + C_2 G_2 + C_3 G_3 + ... + C_i * ZERO + ... + C_n G_n}{C_1 + C_2 + C_3 + \cdots + C_i + ... + C_n}$$

Even if a learner has **failed** in a course **more than once,** the course will figure **only once** in the **numerator** as well as the **denominator**. At the end of semester$r+1$s/he has appeared forexamination for k number of courses including the ith**backlog course** and has cleared all the courses including the **backlog course,** the CGPI at the end of this semester is calculated as,

$$CGPI = \frac{C_1G_1 + C_2G_2 + C_3G_3 + \ldots + C_i * G_i + \ldots + C_nG_n}{C_1 + C_2 + C_3 + \cdots + C_i + \ldots + C_n}$$

There will also be **a final CGPI** calculated which considers **all the credits earned** by the learner specified for a particular programme.

3.5 Heads of Passing

Internal Assessment (IA) and End Semester Examination (ESE) should be two separate heads for passing. Apart from these, Practical and /or Oral examination also should be independent head/s of passing.

3.6 Promotion of Learner and Award of Grades

A learner will be declared **PASS** and eligible for **grade** in M.C.A. course (**post graduate programme**) if,

- A learner secures **at least 45% marks in each head of passing** mentioned above.

3.7 Carry Forward of Marks

In case of a learner who does not fulfill criteria mentioned in section 3.4 and fails in the **InternalAssessment** and/or **End Semester Examination** in one or more courses:

- A learner who **PASSES** in the **Internal Assessment** but **FAILS** in the **End Semester Examination** of the course shall reappear for the **End Semester Examination** of that course. However his/her marks of the **Internal Assessment** shall be **carried over** and he/she shall be entitled for grade obtained by him/her on passing.
- A learner who **PASSES** in the **End Semester Examination** but **FAILS** in the **Internal Assessment** of the course shall **reappear** for the **Internal Assessment** of that course.However his/her marks of the **End Semester Examination** shall be **carried over** and he/she shall be entitled for grade obtained by him/her on passing.

3.8 Reexamination of Internal Assessment and End Semester Examination

Reexamination for **Internal Assessment** should be completed before the commencement ofnext semester theory examination.

Example: A learner who is supposed to reappear for Internal Assessment in semester-I coursewill appear for the reexamination before commencement of End Semester Examination of semester -II.

Re-examination of Internal Assessment will be based on single examination having same marks as of original assessment. A learner who supposed to reappear for Internal Assessment will be given some work by the concerned teacher. The work assigned can be of the form of a course project/ assignment problems/ test/ tutorials etc. A learner will do the submission of the assigned work in the predefined period. Records should be maintained properly for all the re-examinations as well as Internal Assessments.

Reexamination of **End Semester Examination** will be conducted as per the schedule planned by University of Mumbai

3.9 Allowed to Keep Terms (ATKT):

1. A learner shall be allowed to keep term for Semester II irrespective of grades obtained in each course of Semester I.
2. A learner shall be allowed to keep term for Semester III if s/he passes each of Semester I and Semester II

    OR

    S/he fails in not more than **five heads** of passing of Semester I and Semester II taken together.
3. A learner shall be allowed to keep term for Semester IV irrespective of grades obtained in each course of Semester III.
4. A learner shall be allowed to keep term for Semester V if s/he passes in all heads of Semester I, Semester II, Semester III and Semester IV

    OR

    S/he has passed in all heads of Semester I and Semester II and fails in not more than **fiveheads** of passing of Semester III and Semester IV taken together.
5. A learner shall be allowed to keep term for Semester VI irrespective of grades obtained in each course of Semester V.

Note: **Grade AB** should be considered as **failed** and treated as one head for deciding **ATKT**

Note: Even though **Term Work** is not a separate head of passing, a learner should satisfactorily complete Term Work in all courses for a particular semester as per syllabus/curriculum manual to be eligible to appear for any form of examination.

3.10 Student Transfer from Credit and Grading based (CBSGS) to Choice Based Credit System (CBCGS) :

- Students are allowed to transfer from CBSGS to CBCGS subject to clear in equivalent subject at the respective semester as per Equivalence mentioned in section 3.12

- Students who are freshly taking admission for Second year need to follow **Choice Based Credit System (CBCGS)**

- Students who are passing the subjects from **Credit and Grading based (CBSGS)** upto **semester IV** and then transferring to TYMCA for **Choice Based Credit System (CBCGS)** will be evaluated for 150 credits to award the degree of MCA. Such students will have final evaluation based on 150 credits where they will have 26 credits for **semester IV** as that of mentioned in **Credit and Grading based (CBSGS) system**.

3.11 Semester Grade Report

At the end of each semester the semester grade report, which reflects the performance of the learner in that semester, is prepared and issued to the learner. This report includes the fail grades as awarded. Even when a failed course is passed in a later semester, no new modified grade report for that semester in which the fail grade was awarded will be issued. In case of backlog courses learner should be issued separate grade report card as and when s/he passes the course/s.

The grade cards can be issued to the Learners on the basis of the calculations of SGPI/ CGPI given in section 3.4 in a uniform format given by the University. The format of the grade card for the examinations conducted by the colleges shall be the same as the format for all the concerned programmes. The grade card will reflect the letter grade obtained by the learner, credit points of the individual courses of a particular semester, calculation of SGPI for each semester and the CGPI for all the successfully completed courses of Programme till that semester examination.

3.12 : Equivalence Rule

	SEM I		SEM II		SEM III		SEM IV		SEM V		SEM VI	
	CGSGS Subject Code	CBCGS Subject Name	CGSGS Subject Code	CBCGS Subject Name	CGSGS Subject Code	CBCGS Subject Name	CGSGS Subject Code	CBCGS Subject Name	CGSGS Subject Code	CBCGS Subject Name	CGSGS Subject Code	CBCGS Subject Name
	OOP	OOP	DS	DS	DBMS	DBMS	ADTA	AWT	AWT	ADC	PROJECT	INTERNSHIP PROJECT
	SE	SEPM	OS	OS	CG	JAVA	JAVA	DMBI	WMT	WMT	Research Paper	Research Paper
	COA	COA	CN	CN	NS	IS	SMS	CG	SC	UED		
	DM	ITM	FA	FAM	OR	OR	SSD	Elective 1	DCC	Elective 1		
	PPM	PNS	PNS	DMMM	SPM	STQA	Elective 1	Elective 2	Elective 1	Elective 2		
	Prog. And SE Lab	SEPM & OOP Lab	OS & CN lab	CN & OS Lab	CG L	Java & UML Lab	Core & Advanced JAVA	AWT &DMBI Lab	AWT + Dot Net	OSS for ADC		
	Web Tech and Mini Pro	WD & Mini Project Lab	DS & PNS lab	DS&AWD Lab	DBMS +ST	DBMS & ST Lab	ADTA + UML	CG+IP	Wireless & Mobile Technology + Mini project	MAU ED		
						Mini Project 1		SSD		Mini Project 2		
Total Credit	26	26	26	26	28	28	26	28	28	28	16	16

	CGSGS Subject Code	**CBCGS Subject Name**
SEM I	OOP	OOP
	SE	SEPM
	COA	COA
	PPM	ITM
	DM	DMMM (Sem II)
	Prog. And SE Lab	SEPM & OOP Lab
	Web Tech and Mini Pro	WD & Mini Project Lab
Sem II	DS	DS
	OS	OS
	CN	CN
	FA	FAM
	PNS	PNS (Sem I)
	OS & CN lab	OS & CN lab
	DS & PNS lab	DS& AWD Lab
Sem III	DBMS	DBMS
	CG	CG (Sem IV)
	NS	IS
	OR	OR
	SPM	STQA + SEPM (Sem I)
	CG L	CG+IP (Sem IV)
	DBMS +ST	DBMS & ST Lab
		Mini Project 1
Sem IV	ADTA	DMBI
	JAVA	JAVA (Sem III)
	SSD	SSD
	SMS	SMS (Elective 2 Sem IV)
	Elective 1	Elective 1
		Elective 2
	Core & Advanced JAVA	Java Lab (Sem III)
	ADTA + UML	DMBI Lab + UML Lab (Sem III)
Sem V	AWT	AWT (Sem IV)
	WMT	WMT
	SC	AI and SC (Elective 2 Sem IV)
	DCC	Next Generation Networks (Elective 2 Sem IV)
		UED
	Elective 1	Elective 1
		Elective 2
	AWT + Dot Net	AWT Lab (Sem IV)

	Wireless & Mobile Technology	MAUED Lab
		OSS for ADC Lab
	Mini project	Mini Project 2
Sem VI	PROJECT	INTERNSHIP PROJECT
	Research Paper	Research Paper

List of Elective			
SEM IV		**SEM V**	
CGSGS Subject Code	**CBCGS Subject Name**	**CGSGS Subject Code**	**CBCGS Subject Name**
Elective 1 (Select Any one)		Elective 1 (Select Any one) (Departmental Elective)	
GIS	Entrepreneurship Management	Cyber Security	Big Data Analytics
Embedded Systems	ERP	Multimedia Technology	Multimedia System Design
SOA	Ethics and CSR	Information System security and Audit	Intellectual property Rights and Patents (Elective 2 Sem V)
E Business	Business Infrastructure and Management	Bioinformatics	Machine Learning
Human Computer Interface		Software Quality Assurance	Management Information System (Elective 2 Sem V)
			Green Computing
			Internet of Things
Elective 2 (Select Any one)		Elective 2 (Select Any one) (Institutional Elective)	
	Digital Forensics		Research Methodology
	Simulation and Modelling		
	Next Generation Networks		
	AI and Soft Computing		