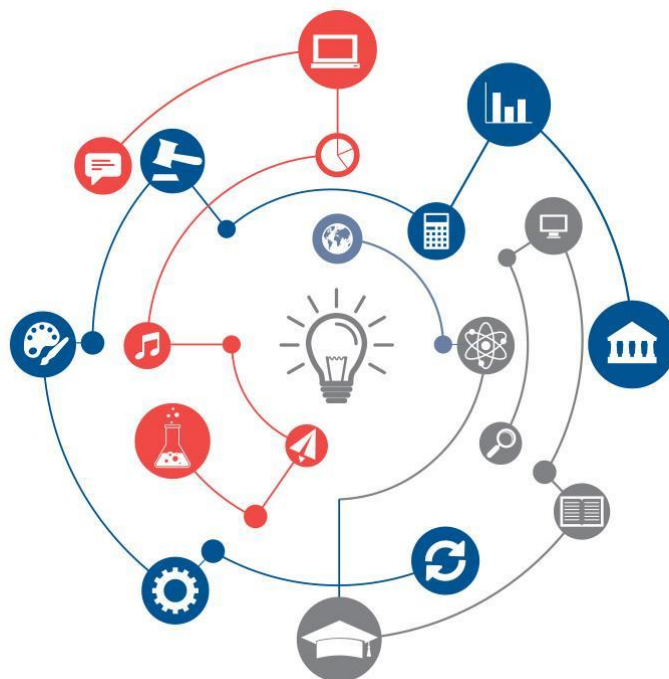


LOCF HANDBOOK

For Evaluation of Course Objectives



Dnyan Prabodhini Mandal's
SHREE MALLIKARJUN & Shri. Chetan Manju Desai College
Canacona Goa

*Manj
Desai*



ADOPTED IN JUNE 2022 FOR IMPLEMENTATION FROM 2023-24



Dnyan Prabodhini Mandal's
SHREE MALLIKARJUN & Shri. Chetan Manju Desai College
Canacona Goa



Principal's Message

The Attitude, Skills and Knowledge of the Youth Population need to be tuned to meet global standards to ensure that India becomes a thought leader.

We require a curriculum that is User-Urgent, User-Relevant and User-Friendly. UGC, under its Quality Mandate, expects the curriculum to be based on Learning Outcomes as an endeavour towards fostering quality higher education in India.



The Learning Outcomes-based Curriculum Framework (LOCF) envisages a more holistic experience for the students, while focusing not just on knowledge delivery in higher education but also on the application of knowledge through field and lab work and emphasises on application of knowledge to real life experiences.

Besides this, students will attain various 21st century skills like critical thinking, problem solving, analytic reasoning, cognitive skills, self-directed learning etc.

Dnyan Prabodhini Mandal's SHREE MALLIKARJUN & Shri. Chetan Manju Desai College considers it its priority be proactive in ushering a positive change necessitated by Learning Outcomes-Based Curriculum Framework and the challenges posed by NEP to deliver on our promises. Evaluation of Learning Outcomes will be of principal importance in ensuring we are steering in the right direction, at the right pace and with the right attitude.

Manj Desai



Prof. (Dr) Manoj S. Kamat
Principal

Learning Outcome-based Curriculum Framework under Choice Based Credit System for Undergraduate Education

What is the LOCF?

- The LOCF specifies what graduates are expected to know, understand and be able to do at the end of their programme of study.
- LOCF approach makes the student an active learner and the teacher a good facilitator and together will lay the foundation for lifelong learning.
- The idea is to decide the desired outcome within the framework of the current *Choice Based Credit System* (CBCS) for undergraduate and postgraduate programmes.
- The outcomes will be determined in terms of skills, knowledge, understanding, employability, attributes, attitudes, values, etc.
- The curriculum will have to be designed to obtain these outcomes.
- In this line, in 2018, UGC issued a public notice followed by a direction to all central institutions.
- It directed them to form subject-specific committees for implementing the Learning Outcomes-based Curriculum Framework.

Dnyan Prabodhini Mandal's SHREE MALLIKARJUN & Shri. Chetan Manju Desai College is guided by the Learning Objectives and Learning Outcomes formed by subject-specific committees that worked for Curriculum Reform under the **Choice-Based Credit System**, Mission, Vision, Aims & Objectives, Core Values of the Institute, Mascot Philosophy, Graduate Attributes, College Anthem to ensure Career Readiness and Holistic Development of Learners.

What is Choice Based Credit System (CBCS)?

CBCS, according to UGC, provides "a 'cafeteria' type approach in which the students can take courses of their choice, learn at their own pace, undergo additional courses and acquire more than the required credits and adopt an interdisciplinary approach to learning".

The Generic Elective (GE) course has to be compulsorily taken from an unrelated discipline/subject.



All Honours students must choose one Generic paper from options offered by disciplines other than their own in semesters 1-4.

Students of non-Honours courses must choose one generic paper from a discipline other than their own in the last two semesters.

Goa University adopted CBCS keeping in view its benefits and being an Affiliated College, Dnyan Prabodhini Mandal's SHREE MALLIKARJUN & Shri. Chetan Manju Desai College implemented CBCS.

What are the benefits of CBCS?

According to UGC, the marks or percentage-based evaluation system obstructs the flexibility for the students to study the subjects/courses of their choice and their mobility to different institutions.

However, CBCS offers opportunities and avenues to learn core subjects but also exploring additional avenues of learning beyond the core subjects for holistic development of an individual.

Though there are challenges in CBCS, the positives outweigh the challenges. And we must welcome Outcomes-Based Learning or Competency-Based Learning as an innovative Pedagogy and consequently, Education must be viewed as the process of imparting or gaining knowledge, developing the powers of reasoning, logic, rationality and judgement, and generally of preparing oneself or others intellectually for a mature life. And regarding challenges in design, delivery and attainment of outcomes, one would do well to remember Paulo Freire, the Brazilian author of 1968 classical treatise, "Pedagogy of the Oppressed" who opined that Knowledge emerges only through invention and reinvention, through the restless, impatient, continuing, hopeful inquiry that human beings pursue in the world, with the world, and with each other.

The focus has changed from Teacher-Centric to **Learner-Centric Education** with various types of learning being available such as Outcome-based Learning; Competency-based Learning; Problem-based Learning; Project-based Learning; Inquiry-based Learning; Work-based Learning; Team-based Learning; Design-based Learning; Narrative-based Learning; Challenge-based Learning; Activity-

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based Learning; Evidence-based Learning; Experiential Learning and Computer-Assisted Learning.

Further, **Evaluation Rubrics** have contributed to bias-neutrality and objectivity leading to fair evaluations.

OBE expects every graduate to have attained certain **graduate attributes** that define the characteristics of a student's university degree programme(s), and describe a set of characteristics/competencies that are transferable beyond study of a particular subject area and programme contexts in which they have been developed.

The UGC's **Expectancy Mapping** with regard to **GRADUATE ATTRIBUTES** which is accepted by our institution is as follows:

1 Disciplinary knowledge: Capable of demonstrating comprehensive knowledge and understanding of one or more disciplines that form a part of an undergraduate programme of study.

2 Communication Skills: Ability to express thoughts and ideas effectively in writing and orally; Communicate with others using appropriate media; confidently share one's views and express herself/himself; demonstrate the ability to listen carefully, read and write analytically, and present complex information in a clear and concise manner to different groups.

3 Critical thinking: Capability to apply analytic thought to a body of knowledge; analyse and evaluate evidence, arguments, claims, beliefs on the basis of empirical evidence; identify relevant assumptions or implications; formulate coherent arguments; critically evaluate practices, policies and theories by following scientific approach to knowledge development.

4 Problem solving: Capacity to extrapolate from what one has learned and apply their competencies to solve different kinds of non-familiar problems, rather than replicate curriculum content knowledge; and apply one's learning to real life situations.

5 Analytical reasoning: Ability to evaluate the reliability and relevance of evidence; identify logical flaws and holes in the arguments of others; analyse and synthesise data from a variety of sources; draw valid conclusions and support them with evidence and examples, and addressing opposing viewpoints.

6 Research-related skills: A sense of inquiry and capability for asking relevant/appropriate questions, problematising, synthesising and articulating;

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Ability to recognise cause-and-effect relationships, define problems, formulate hypotheses, test hypotheses, analyse, interpret and draw conclusions from data, establish hypotheses, predict cause-and-effect relationships; ability to plan, execute and report the results of an experiment or investigation.

7 Cooperation/Team work: Ability to work effectively and respectfully with diverse teams; facilitate cooperative or coordinated effort on the part of a group, and act together as a group or a team in the interests of a common cause and work efficiently as a member of a team.

8 Scientific reasoning: Ability to analyse, interpret and draw conclusions from quantitative/qualitative data; and critically evaluate ideas, evidence and experiences from an open-minded and reasoned perspective.

9 Reflective thinking: Critical sensibility to lived experiences, with self-awareness and reflexivity of both self and society.

10 Information/digital literacy: Capability to use ICT in a variety of learning situations, demonstrate ability to access, evaluate, and use a variety of relevant information sources; and use appropriate software for analysis of data.

11 Self-directed learning: Ability to work independently, identify appropriate resources required for a project, and manage a project through to completion.

12 Multicultural competence: Possess knowledge of the values and beliefs of multiple cultures and a global perspective; and capability to effectively engage in a multicultural society and interact respectfully with diverse groups.

13 Moral and ethical awareness/reasoning: Ability to embrace moral/ethical values in conducting one's life, formulate a position/argument about an ethical issue from multiple perspectives, and use ethical practices in all work. Capable of demonstrating the ability to identify ethical issues related to one's work, avoid unethical behaviour such as fabrication, falsification or misrepresentation of data or committing plagiarism, not adhering to intellectual property rights; appreciating environmental and sustainability issues; and adopting objective, unbiased and truthful actions in all aspects of work.

14 Leadership readiness/qualities: Capability for mapping out the tasks of a team or an organization, and setting direction, formulating an inspiring vision, building a team who can help achieve the vision, motivating and inspiring team members to engage with that vision, and using management skills to guide people to the right destination, in a smooth and efficient way.

15 Lifelong learning: Ability to acquire knowledge and skills, including 'learning how to learn', that are necessary for participating in learning activities

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throughout life, through self-paced and self-directed learning aimed at personal development, meeting economic, social and cultural objectives, and adapting to changing trades and demands of work place through knowledge/skill development/reskilling.

QUALIFICATION DESCRIPTORS:

A qualification descriptor indicates the generic outcomes and attributes expected for the award of a particular type of qualification (for e.g., a bachelor's degree or a bachelor's degree with honours). The qualification descriptors also describe the academic standard for a specific qualification in terms of the levels of knowledge and understanding, skills and competencies and attitudes and values that the holders of the qualification are expected to attain and demonstrate. These descriptors also indicate the common academic standards for the qualification and help the degree-awarding bodies in designing, approving, assessing and reviewing academic programmes. The learning experiences and assessment procedures are expected to be designed to provide every student with the opportunity to achieve the intended programme learning outcomes. The qualification descriptors reflect both disciplinary knowledge and understanding as well as generic skills, including global competencies, that all students in different academic fields of study should acquire/attain and demonstrate.

Qualification descriptors for a Bachelor's Degree programme: The students who complete three years of full-time study of an undergraduate programme of study will be awarded a Bachelor's Degree. Some of the expected learning outcomes that a student should be able to demonstrate on completion of a degree-level programme may include the following:

Demonstrate (i) a fundamental/systematic or coherent understanding of an academic field of study, its different learning areas and applications, and its linkages with related disciplinary areas/subjects; (ii) procedural knowledge that creates different types of professionals related to the disciplinary/subject area of study, including research and development, teaching and government and public service; (iii) skills in areas related to one's specialization and current developments in the academic field of study.

Use knowledge, understanding and skills required for identifying problems and issues, collection of relevant quantitative and/or qualitative data drawing on a wide range of sources, and their application, analysis and evaluation using

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methodologies as appropriate to the subject(s) for formulating evidence-based solutions and arguments;

Communicate the results of studies undertaken in an academic field accurately in a range of different contexts using the main concepts, constructs and techniques of the subject(s);

Meet one's own learning needs, drawing on a range of current research and development work and professional materials;

Apply one's disciplinary knowledge and transferable skills to new/unfamiliar contexts, rather than replicate curriculum content knowledge, to identify and analyse problems and issues and solve complex problems with well-defined solutions.

Demonstrate subject-related and transferable skills that are relevant to some of the job trades and employment opportunities.

Qualification descriptors for a Bachelor's Degree with honours: The qualification descriptors for a Bachelor degree with honours may include the following:

Demonstrate (i) a systematic, extensive and coherent knowledge and understanding of an academic field of study as a whole and its applications, and links to related disciplinary areas/subjects of study; including a critical understanding of the established theories, principles and concepts, and of a number of advanced and emerging issues in the field of study; (ii) procedural knowledge that creates different types of professionals related to the disciplinary/subject area of study, including research and development, teaching and government and public service; (iii) skills in areas related to one's specialization and current developments in the academic field of study, including a critical understanding of the latest developments in the area of specialization, and an ability to use established techniques of analysis and enquiry within the area of specialisation.

Demonstrate comprehensive knowledge about materials, including current research, scholarly, and/or professional literature, relating to essential and advanced learning areas pertaining to the chosen disciplinary areas (s) and field of study, and techniques and skills required for identifying problems and issues relating to the disciplinary area and field of study.

Demonstrate skills in identifying information needs, collection of relevant quantitative and/or qualitative data drawing on a wide range of sources, analysis

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and interpretation of data using methodologies as appropriate to the subject(s) for formulating evidence-based solutions and arguments;

Use knowledge, understanding and skills for critical assessment of a wide range of ideas and complex problems and issues relating to the chosen field of study.

Communicate the results of studies undertaken in an academic field accurately in a range of different contexts using the main concepts, constructs and techniques of the subject(s) of study;

Address one's own learning needs relating to current and emerging areas of study, making use of research, development and professional materials as appropriate, including those related to new frontiers of knowledge.

Apply one's disciplinary knowledge and transferable skills to new/unfamiliar contexts and to identify and analyse problems and issues and seek solutions to real-life problems.

Demonstrate subject-related and transferable skills that are relevant to some of the job trades and employment opportunities.

PROGRAMME LEARNING OUTCOMES

The outcomes and attributes described in qualification descriptors are attained by students through learning acquired on completion of a programme of study. The term 'programme' refers to the entire scheme of study followed by learners leading to a qualification. Individual programmes of study will have defined learning outcomes which must be attained for the award of a specific certificate/diploma/degree. The programme learning outcomes are aligned with the relevant qualification descriptors.

Programme learning outcomes will include subject-specific skills and generic skills, including transferable global skills and competencies, the achievement of which the students of a specific programme of study should be able to demonstrate for the award of the certificate/ Diploma/Degree qualification. The programme learning outcomes would also focus on knowledge and skills that prepare students for further study, employment, and citizenship. They help ensure comparability of learning levels and academic standards across colleges/universities and provide a broad picture of the level of competence of graduates of a given programme of study. A programme of study may be mono disciplinary, multi-disciplinary or inter-disciplinary.

COURSE LEARNING OUTCOMES:

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The programme learning outcomes are attained by learners through the essential learnings acquired on completion of selected courses of study within a programme. The term 'course' is used to mean the individual courses of study that make up the scheme of study for a programme. Course learning outcomes are specific to the learning for a given course of study related to a disciplinary or interdisciplinary/multi-disciplinary area. Some programmes of study are highly structured, with a closely laid down progression of compulsory/core courses to be taken at particular phases/stages of learning. Some programmes allow learners much more freedom to take a combination of courses of study according to the preferences of individual student that may be very different from the courses of study pursued by another student of the same programme. Course-level learning outcomes will be aligned to programme learning outcomes. Course level learning outcomes are specific to a course of study within a given programme of study. The achievement by students of course-level learning outcomes lead to the attainment of the programme learning outcomes. At the course level, each course may well have links to some but not all graduate attributes as these are developed through the totality of student learning experiences across the years of their study. A course map would indicate the linkage between course learning outcomes and each programme learning outcome.

COURSE MAP SPECIMEN

Programme outcomes	Courses						
	Course 1	Course 2	Course ...	Course ...	Course ...	Course ...	Course ...
Outcome 1	x	x	x	x	x	x	x
Outcome 2	x		x	x		x	
Outcome ...		x		x	x	x	x
Outcome ...		x		x	x	x	
Outcome ...	x		x		x		x
Outcome ...	x		x		x	x	x
Outcome ...		x		x		x	

TEACHING - LEARNING PROCESS:

The Learning Outcomes-Based Approach to curriculum planning and transaction requires that the teaching-learning processes are oriented towards enabling students to attain the defined learning outcomes relating to the courses within a programme. The outcome- based approach, particularly in the context of

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undergraduate studies, requires a significant shift from teacher-centric to learner-centric pedagogies, and from passive to active/participatory pedagogies. Planning for teaching therein becomes critical. Every programme of study lends itself to well-structured and sequenced acquisition of knowledge and skills. Practical skills, including an appreciation of the link between theory and experiment, will constitute an important aspect of the teaching-learning process. Teaching methods, guided by such a framework, may include: lectures supported by group tutorial work; practicum and field-based learning; ^L_{SEP} the use of prescribed textbooks and e-learning resources and other self-study materials; open-ended project work, some of which may be team-based; activities designed to promote the development of generic/transferable and subject-specific skills; and internship and visits to field sites, and industrial or other research facilities etc.

ASSESSMENT METHODS:

A variety of assessment methods that are appropriate to a given disciplinary/subject area and a programme of study will be used to assess progress towards the course/programme learning outcomes. Priority will be accorded to formative assessment. Progress towards achievement of learning outcomes will be assessed using the following: time-constrained examinations; closed-book and open-book tests; problem-based assignments; practical assignment laboratory reports; observation of practical skills; individual project reports (case-study reports); team project reports; oral presentations, including seminar presentation; viva voce interviews; computerised adaptive testing; peer and self-assessment etc. and any other pedagogic approaches as per the context.

In the present context, Dnyan Prabodhini Mandal's SHREE MALLIKARJUN & Shri. Chetan Manju Desai College uses **Assessment Methods** such as:

- 1 HSSC Marks as indicators of performance level for First Year Students**
- 2 Preliminary Bridge Course for those seeking admission through change of stream option at First Year**
- 3 FY Marks, SY Marks as performance indicators to track progress**
- 4 Formative Formal Assessments (ISA 1, ISA 2 and ISA 3)**
- 5 Verbal Interaction with students from time to time**
- 6 Observation of Practical Skills**



- 7 Oral Presentation**
- 8 Laboratory Reports**
- 9 Practical Assignments**
- 10 Third Year Project Reports (Individual/Team)**
- 11 Viva Voce**
- 12 PowerPoint Presentations**
- 13 Problem-based Assignments**
- 14 Digital Story Telling**
- 15 Field Trip Reports**
- 16 Group Discussions**
- 17 Self-Assessment**
- 18 Internship Feedback**
- 19 Performance in NCC, NSS, Sports & Cultural Activities**
- 19 Formative Assessments (Semester End Examinations)**

This indicative list affirms institutional efforts at ensuring Intended Objectives and Outcomes are properly aligned to one another.

With NEP, the exercise of constant assessment will become more rigorous and methodological with the college attempting to engage a Software Developer to provide a Software tailored to our needs that will pull data from all departments, NSS, NCC, Sports, Cultural Committees as well as Exam Section to create individual profiles of students to track progress in terms of attainment of course objectives and outcomes. The icing on our cake of happiness would be if a similar initiative is taken by Directorate of Higher Education and include such module in its vibrant DHE Portal as it would be of immense use to all institutions of Higher Education.

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Sample Formats for Attainment Mapping:

COURSE OUTCOMES	PROGRAM OUTCOMES											
	1	2	3	4	5	6	7	8	9	10	11	12
Course 1												
CO 1. Apply mass balance and composition balance in interfacial mass transfer				H								
CO 2. Apply the concept of interfacial mass transfer in multiphase contact processes.				H					L			
CO 3. Design and working of various mass transfer equipments.				H		H			H			

Course 2

CO1.Distinguish the performance of non-ideal with ideal systems.		H										
CO2.Determine rate expression using reaction	L	H		H								

Reg no	Internal Exams															University Exams														
	Test 1					Test 2					Models																			
	CO1	CO2	CO3	CO4	CO5	Total	CO1	CO2	CO3	CO4	CO5	Total	CO1	CO2	CO3	CO4	CO5	Total	CO1	CO2	CO3	CO4	CO5	Interns	Total					
16bcs01	30	40				70							20	30	25	75	17	18	15	9	15	74	9	6	20	13	20	24	32	
16bcs02	25	37				62							25	25	25	75	18	14	8	11	9	60	8	7	15	14	19	23	86	
16bcs03	10	30				40							14	20	25	59	13	13	11	15	11	63	7	8	20	10	18	21	84	
16bcs04	14	20				24							10	17	24	51	20	15	17	14	15	81	6	4	11	5	15	17	58	
No of students attended	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4														
Max mark co wise	50	50	0	0	0	100	0	0	0	30	30	40	100	20	20	20	20	20	20	100	10	10	20	15	20	25	100			
Threshold 50%;	25	25				50				15	15	20	50	10	10	10	10	10	50	5	5	10	7.5	10	12.5	50				
No of students above threshold	2	3				2				3	4	4	4	4	4	3	3	3	3	4	4	3	4	3	4	4	4	4	4	
Level	1	3				1				3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	
RUBRICS																														
50% OF STUDENT ABOVE 50% - 1 (LOW)																														
60% OF STUDENT ABOVE 50% - 2 (MEDIUM)																														
70% OF STUDENT ABOVE 50% - 3 (HIGH)																														

RUBRICS

50% OF STUDENT ABOVE 50% - 1 (LOW)
60% OF STUDENT ABOVE 50% - 2 (MEDIUM)
70% OF STUDENT ABOVE 50% - 3 (HIGH)

PO ATTAINMENT

SUBJECTWISE PO ATTAINMENT

COURSE CODE	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C101	-	-	-	-	-	1.59	1.59	1.59	2.64	2.64	-	1.76	-	0.88	1.59
C202	2.88	2.11	2.16	1.92	1.54	2.50	-	-	-	1.92	2.11	2.11	2.40	1.92	-
C303	2.86	-	1.91	1.91	-	-	-	-	-	-	-	-	0.95	0.95	-
C404	2.19	2.58	2.58	2.98	-	2.38	2.98	2.98	-	2.48	2.24	-	1.99	2.58	2.98
DIRECT	2.57	2.47	2.35	2.27	1.96	2.08	2.32	2.29	2.71	2.16	2.03	2.11	1.87	1.91	2.29
INDIRECT	3.00	2.00	2.00	1.33	2.00	2.33	1.33	1.67	2.00	2.00	2.33	2.33	2.33	2.00	1.00
DIRECT 80%	2.05	1.97	1.88	1.81	1.57	1.66	1.85	1.83	2.17	1.73	1.62	1.69	1.50	1.53	1.83
INDIRECT 20%	0.60	0.40	0.40	0.27	0.40	0.47	0.27	0.33	0.40	0.40	0.47	0.47	0.47	0.40	0.20
PO ATTAINMENT	2.65	2.37	2.28	2.08	1.97	2.13	2.12	2.16	2.57	2.13	2.09	2.16	1.97	1.93	2.03

OBE (Outcome Based Education)

Department Handling: Computer science
Class name: B.Sc.(CS)
Name Of Course Coord...: Mrs Priyas Muthuvel

Course Name: Data Structure and Algorithm
Course Code: 18DAT5001

Test Type

CIA 1

Q Nos / Roll Number	1	2	3	4	5	6	7	8	9	10	11A	11B	12A	12B	13A	13B	14A	14B	15A	15B	16A	16B	Total	Final Marks
Maximum Marks	1	1	1	1	1	1	1	1	1	1	5	5	5	5	5	5	5	5	10	10	10	10	50	100
Taxonomy Categories	A	Y	Y	C	R	A	C	R	E	E	C	C	E	E	A	A	Y	Y	R	R	Y	Y		
01 MBA 51	1	1	1	1	1	1	1	0	1	0	2		3		5		4		5		4		31	62
01MBA 100	0	0	0	0	1	1	1	0	0	1	5		4		4		3		2		5		27	54
15MBA2015	0	1	1	1	0	1	0	1	1	1	5		5		4		4		5		3		33	66

Save

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