

Review Article

# Graduate Teaching Through SWAYAM: A Comprehensive Analysis

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Received Date: 31 January 2021

Revised Date: 20 March 2021

Accepted Date: 23 March 2021

**Abstract** - The onset of Massive Open Online Courses (MOOCs) has brought about a drastic revolution in the area of imparting knowledge to learners worldwide, who do not have access to traditional learning systems and also to those who cannot afford the cost of higher education. MOOCs have served as an additional benefit for students for simultaneously pursuing regular courses of study while also enrolling for varied online courses which have tremendous relevance in diverse fields. In India, these courses have gained popularity for reasons of acquiring knowledge, skills, professional excellence, entrepreneurship, and exploring and enhancing career avenues. The present study was undertaken to assess MOOCs through SWAYAM, which stands for Study Webs of Active Learning for Young Aspiring Minds, which is an initiative of the Education Ministry. In the present research, study focus has been made on courses made by the Consortium for Educational Communication (CEC) which is one of the Nine National coordinators for developing e-content for graduate and postgraduate online courses. An intensive literature review and study of the SWAYAM website has been done by the researchers to collect information regarding the types of online courses offered by various institutes in India, the fields covered in these courses, the structure and design of these courses, mode of production, etc. An effort has also been made to assess the challenges posed to MOOCs. The results revealed a positive impact of these courses with regard to accessibility, affordability, quality of course content, increasing the knowledge, awareness, and skills amongst students.

**Keywords** - CEC, MOOCs, SWAYAM, Computer courses, Online Education, Information Technology

## I. INTRODUCTION

The last decade has seen the popularity of MOOC courses soar all over the world and in India. The reasons for this are many. Affordable electronic devices and the internet have enabled access to several MOOC websites. The enrolment fee of the courses is low, and a lot of content can often be accessed for free. The institutions and universities sponsoring MOOC websites have helped MOOCs gain credibility. Several of these MOOC courses

are pre-recorded and available in multiple languages. One also has the liberty to pause lectures and revisit concepts. All these factors have contributed to the popularity of these courses.

In the year 2012, there was a proliferation of MOOC Courses across the world. Renowned MOOC websites such as Coursera and EdX were established this year. New York Times famously termed 2012 as the “Year of the MOOC” [1]. India too became involved with these MOOC experiments with an IT course on Coursera titled ‘Web Intelligence and Big Data’ taught by Dr. Gautam Schroff of Tata Consultancy Services between 2012-14 [2]. Larks Learning and Sunstone Business also launched MOOC courses pertaining to Information Technology in the year 2012 [3]. In 2012, IIT Kanpur developed an online course on Software Architecture and cloud computing. This paves the way for the Institute to establish *mooKIT* in 2014 that has several engineering and computer MOOC courses [4].

Over the course of the past two decades, India has seen rampant growth in the sphere of online education with numerous government-sponsored initiatives. In 2003, seven Indian Institutes of Technology (Delhi, Kharagpur, Bombay, Roorkee, Guwahati, Madras, and Kanpur) along with the Indian Institute of Science, Bangalore, founded the *National Programme on Technology Enhanced Learning* (NPTEL). It is funded by the Ministry of Human Resource Development [5].

During the first phase of development, NPTEL designed 235 audiovisual courses pertaining to the fields of civil engineering, computer science and engineering, electrical engineering, computer electronics and communication engineering, and mechanical engineering. Between 2009 and 2014, 600 videos were added with subjects covering more branches of engineering at undergraduate and postgraduate levels. Management courses were also included. This was described by NPTEL as their second phase of development. NPTEL is the largest repository in the world of engineering courses [5]. In 2014, NPTEL used Google’s open-source software called *Course Builder* to design MOOC courses, and in 2015-16, 90 additional MOOC Courses were added [3].



In 2017, the Government of India launched SWAYAM, which is a Hindi acronym for *Study Webs of Active Learning for Young Aspiring Minds*. SWAYAM offers a wide range of MOOCs that have been made in collaboration with 203 Institutes/ Universities. As of December 2020, they have 3562 courses and over 16 million enrollments [6]. The courses that SWAYAM offers are diverse in nature. It makes courses pertaining to the domain of higher education right from school level education (Classes 9<sup>th</sup> to 12<sup>th</sup>), courses for teacher training, courses in fields of Science, Humanities, Law, Arts, and various multidisciplinary courses. Several courses are also based on an advanced curriculum that caters to the Choice Based Credit System (CBCS) that is being used in several Universities across the country. The Consortium for Educational Communication (CEC) has been given the responsibility for the development of various MOOCs for graduate and postgraduate students, which are hosted by SWAYAM. Apart from professional courses, there are skill-specific courses and courses for life-long learners that can be taken by anyone to enhance their education.

In this paper, we shall be focusing on the genesis of SWAYAM & CEC, guidelines for the creation of online courses, and a review of the courses offered by CEC (January—July 2020 cycle ) that are run on the SWAYAM platform.

## II. GENESIS of SWAYAM

In 2014, the Ministry of Human Rights Development (MHRD) announced SWAYAM under its national mission on education through Information and Communication Technology (NME-ICT). A committee was formed to develop and provide guidelines to institutions for the development and implementation of MOOCs.

SWAYAM is the world’s largest initiative of its kind taken by any government to consolidate the education governing bodies under one umbrella and make quality education accessible to all in the country free of cost. The SWAYAM platform was developed by MHRD and All India Council for Technical Education (AICTE) with Microsoft as a technology partner. Microsoft was awarded a contract by MHRD in June 2016 for the development of SWAYAM [7].

WizQ joined forces with Microsoft to develop and implement the platform. Microsoft played an immense role in planning the entire project. While Microsoft was involved more in the business delivery aspects, WizQ, on the other hand, handled the technical development and implementation of the project. Microsoft Azure is robust, and its infinitely scalable cloud infrastructure with automatic load balancing ensures that millions of educators and learners use the platform seamlessly. The SWAYAM portal was successfully launched on July 9, 2017.

The platform offers practically endless storage given the size of the content uploaded for mass consumption. SWAYAM platform offers relevant searches in multiple regional languages. The videos produced for different

courses have the option of adding captions/ subtitles in 9 different regional languages.

For the creation of MOOCs, SWAYAM has appointed 9 National Coordinators that develop MOOCs for the SWAYAM portal [8]:

<i>National Coordinator</i>	<i>Purpose of Courses</i>
1. All India Council for Technical Education (AICTE)	For self-paced and international courses
2. National Programme for Technology Enhanced Learning (NPTEL)	Engineering
3. University Grants Commission (UGC)	Non-Technical Post-Graduation Education
4. National Council of Educational Research and Training (NCERT)	For School Education
5. National Institute of Open Schooling (NIOS)	For School Education
6. Indira Gandhi National Open University (IGNOU)	For out-of-school students
7. Indian Institute of Management (IIM), Bangalore	For Management Studies
8. National Institute of Technical Teachers Training and Research (NITTTR)	Teacher Training Programmes
9. Consortium for Educational Communication (CEC)	For Undergraduate and Postgraduate Programmes

## III. GENESIS of CEC

For the purpose of teaching through mass media, especially television, the UGC set up the Countrywide Classroom Teaching Programme in 1984. For this, 6 media centers were established. In 1993, the CEC was created to act as a nodal agency for the production of educational programs through the use of electronic and new media, along with the appropriate use of ICT. CEC became responsible for promoting digital learning and coordinating the production of educational programs (video& audio). In March 2016, CEC was appointed the National Coordinator for developing courses for the SWAYAM portal. They developed 31 undergraduate and 72 postgraduate courses by repurposing the existing E-content from their repository in various subjects. In the very first trial of MOOCs courses in 2016, 9300 students enrolled. In the following year, a tremendous leap in enrollment of students (80,000) and UG courses offered (70) was observed [9] Currently,

under CEC, there are 21 Media Centres all over the country, and they are actively engaged in the production of various Graduate and Under-Graduate Level Courses [9]. These media centers are producing fresh MOOCs courses and also repurposing numerous existing e-contents from their repository. The CEC courses offered in January 2019 were taken up by 70,000 students, and for the July-December 2019 session, additional 91 courses were offered on the SWAYAM portal [10]. As of 2020, the Swayam portal shows a total of 124 courses being offered for UG and PG courses. A number of courses offered are re-run on the portal because of their popularity. However, a majority of the courses offered are repurposed from the existing e-contents available with CEC, and a few new courses are added in every cycle of the MOOCs scheduled in the January and July session.

Anyone can enroll and take these courses free of charge. However, if an individual desires a certificate of completion, they must sign up for a proctored exam that is collectively conducted by SWAYAM and the National Testing Agency upon the completion of the course. The fee charged for this exam and certificate is 1000/- Rupees (INR). For the first time, the examination was conducted in December 2018, when 2938 students registered, and 1627 students were awarded the certificate [11].

#### IV. GUIDELINES FOR CREATING ONLINE COURSES FOR SWAYAM

The guidelines for creating online courses for SWAYAM were issued by the Department of Higher Education, Ministry of Human Resource Development for creating online courses [10]. These guidelines give the background to the inception and concept of SWAYAM courses that include credit course and non-credit course along with definitions and terms pertaining to the course and course guidelines through the SWAYAM Board (SB) and SWAYAM Academic Board (SAB).

##### A. The Four Quadrant Approach

The structure of all MOOC Courses, as defined in the Guidelines, follows what is called a **Four-Quadrant approach**:

- a) **Quadrant I- E-tutorials**: The Modules for various courses are developed in the form of videos with auditory and virtual simulations. Transcription of the video is done in various languages.
- b) **Quadrant II- E-content**: This quadrant deals with E-content that contains resources such as e-books, presentations, weblinks, and self-instructional material.
- c) **Quadrant III- Discussion Forum**: The third quadrant features a 'Discussion Forum' wherein a student can discuss the course taught and post queries. A peer taking the course or the teacher(s) can answer these questions.
- d) **Quadrant IV- Assessment**: The last quadrant deals with the evaluation of a student through questions, assignments, and quizzes.

The Quadrant approach is followed by several other MOOC platforms worldwide. This approach towards the creation of courses ensures that the major aspects of physical classroom teaching are mimicked. The Discussion Forums enable peer-to-peer interaction related to the course with regular interventions by the Course Coordinators. The transcription of the videos into various languages ensures that this knowledge is available to people who study in vernacular-mediums. This, in many ways, is a form of democratization of education wherein good content is free of cost and is multilingual.

For the creation of an online course, SWAYAM has laid down five steps:

- a) **Identification**: wherein the National Coordinator (NC) identifies courses that can be taught online. The identified courses are published in the newspaper and other media calling for 'Expression of Interest (EoI)'. The National Coordinator evaluates the EoI and identifies a Course Coordinator, a Subject Matter Expert for each course. The courses that have credits or certification have to be cleared by the 'host' that is, the University or the Institute responsible for conducting the examination, assessment. This host is also responsible for granting credit.
- b) **Pre-production activities (12 weeks/Online Course)**: In the Proposal for a MOOC course, the entire module with its course design, requirement, schedule, videos, reading material, assessment, and criteria for certification needs to be certified. Once this proposal is cleared, the National Coordinator is responsible for the release of funds to the course coordinator for the production of the course.
- c) **Production activities (8 weeks/ Online Course)**: The Course Coordinator is responsible for the production of the videos after identifying the studio for shooting modules, selecting a production team, duration, presentation techniques, and transcription of videos.
- d) **Postproduction activities (4 weeks/Online Course)**: Post-Production team is responsible for editing and/or adding required multimedia effects.
- e) **Review of the Course content and approvals (4 weeks/Online Course)**: After the completion of the aforementioned process, The National Coordinator consults a committee of Subject Matter Expert Groups (SMEGs) after who's quality approval the Academic Advisory Council (AAB) reviews the course. The approved course is uploaded on the SWAYAM Portal [12].

##### B. Equipment Required for course production

The guidelines provided for video creation are extensive and specific. An HD camera and a tripod, a card reader, interactive touch screen panel with the appropriate software, and stylus pen are required. A touch screen laptop, graphic card reader, vision mixer/switcher, microphones, audio mixers, cool studio lighting, A 2-way active speaker, and UPS are also required. It can be seen

that the guidelines are extremely strict in order to upkeep high standards and good quality of education. There are several steps during the course of which multiple boards and agencies overlook the content and quality of the programs. This is done to provide a course that meets the standards set by SWAYAM in the guidelines. The technology used is new, and the devices required are high maintenance and expensive. The requirements enable the Course Coordinators to design proper quizzes, assessments, material, online resources, tutorials, graphics, videos, and transcription of the videos for sharing the relevant information and assessing the students' progress.

**C. Cost of Course Production:**

According to an office memorandum issued by the Ministry of Human Resource Development in 2017, the cost structure for creating a Swayam MOOC course is INR 900,000. This is inclusive of preparation of material, camera costs, academic review by experts, technical review by an expert, post-production cost. In some cases, existing material is also repurposed into a new MOOCs course; the tentative cost for this is INR 600,000 according to Swayam's guidelines [12].

**V. ANALYSIS OF MOOC COURSES OFFERED BY CEC FOR JANUARY-JULY 2020 CYCLE**

During the January–July cycle, CEC offered a total of 104 courses on the SWAYAM portal. These courses were critically analyzed, and we present our findings here.

**A. Duration, level, and Credits of the Courses**

As far as the duration of these courses is concerned, the majority of them are 15 or 12 weeks long (40 and 39% respectively). However, there are also courses that are 8 weeks, 6 weeks, and even 16 weeks long. These numbers are illustrated through a pie chart below.

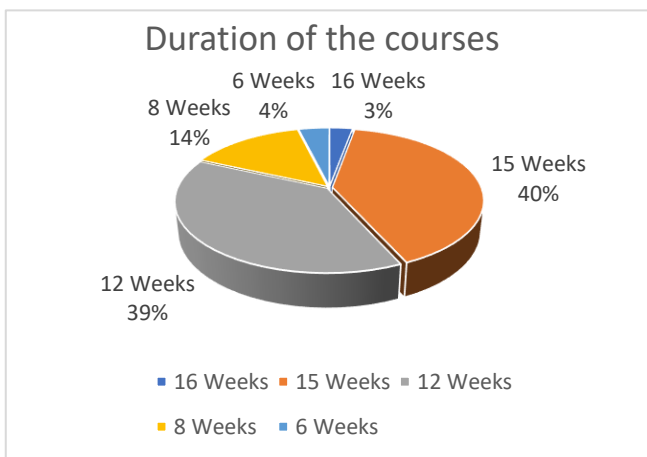


Fig. 1 Duration of MOOC Courses

See on the information available of each CEC course, we observed that 56% of all the courses were made for Undergraduate (UG) Level students. A substantial number of these courses are advanced and made for Postgraduate (PG) Level students (36%). A minority of these courses, i.e.,7%, could also be taken by both UG and PG level students. Additionally, 1% of the courses dealt with

Diploma courses too. The proportion of courses offered for UG and PG levels can be seen through this pie chart. See fig.2.

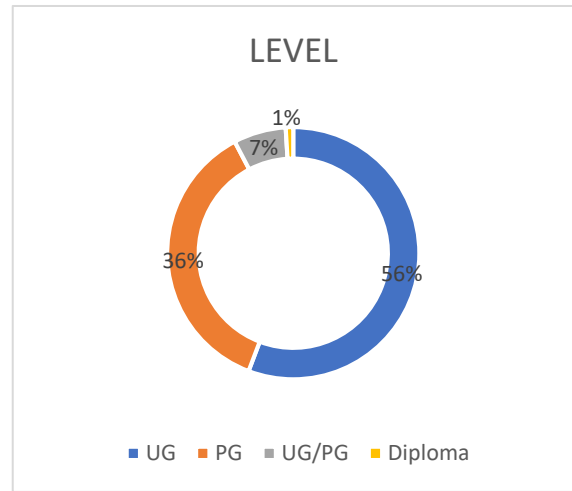


Fig. 2 Proportion of UG, PG, UG/PG, and Diploma Level Courses

The majority of the courses also carried certain numbers of Credits. This is extremely beneficial for students who are enrolled in Choice Based Credit System, wherein students get the option of choosing their Generic Elective and Discipline-Specific Courses.

Courses on the SWAYAM portal facilitate credit transfers if a course is undertaken to its completion. Out of 100 such CEC courses, 67 were core courses, and 33 were Elective courses. This is represented in the chart below. See fig.3

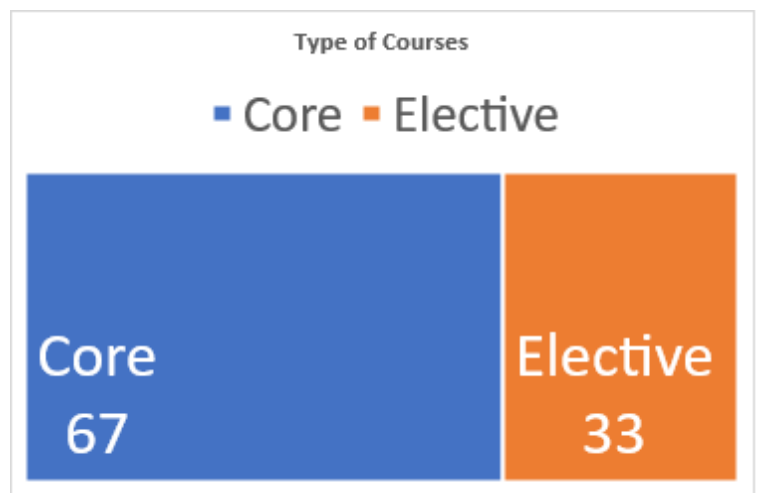


Fig. 3 Proportion of Core and Elective Courses

**B. Universities/ Institutes offering MOOC Courses:**

CEC Courses of the January 2020 cycle were offered by 64 Institutes. This vast number comprises several Central, State, and Private Universities and Colleges. The National Law University in New Delhi offers the maximum number of courses out of all the institutions.

They have been conducting seven courses related to Law and Jurisprudence since 2018 [13]. Savitribai Phule University is a State University in Pune that offers 6 MOOC courses- four in the field of Management Studies, one in Computer Science and Engineering, and one Arts course. The English and Foreign Languages University (EFLU), Hyderabad, runs five courses in diverse fields.

EFLU is the only university dedicated to languages in South Asia. It offers two courses of multidisciplinary nature, and there is one course each on Law, Teacher Education and one course of Humanities and Social Sciences. The major institutes conducting various MOOC courses can be seen in figure 4.

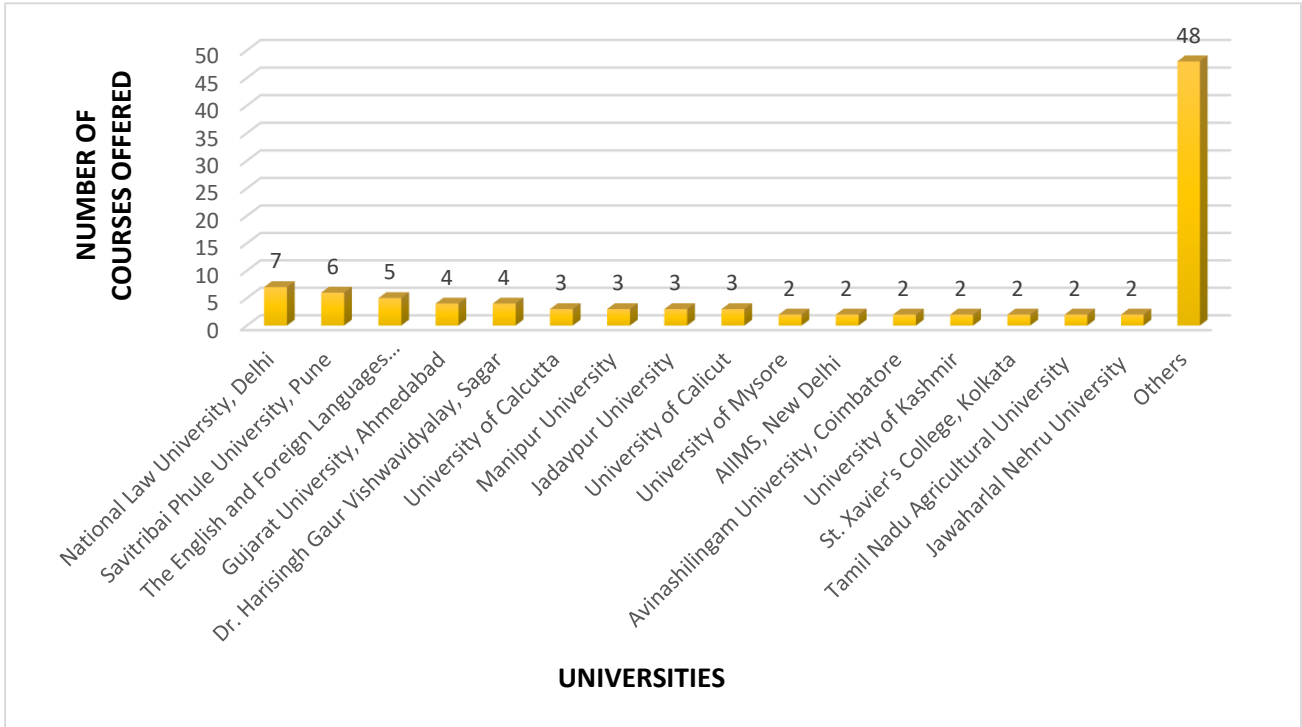


Fig. 4 Number of Courses offered by various Universities

**C. Category of SWAYAM Courses:**

The Swayam website shows the CEC courses that are offered being classified into various categories, based on the specific field the course belongs to.

The humanities and Social Sciences category has 17 courses from various disciplines such as Geography, Philosophy, Economics, History. These courses are taught by 15 institutes. ‘Research Methodology’ course has the highest enrolment number with 5290 enrolments. The average enrolment in Humanities and Social Sciences courses is 1497. There are 12 courses of Management Studies taught by 11 institutes. The course with the highest number of enrolments is ‘Business Planning and Project Management, taught by Savitribai Phule University, Pune, with an enrolment number of 4697. The average enrolment in this category is 2534. There are 10 courses of various subjects in Law offered by 4 different universities. The average number of enrolment of students is 1793, and the course with the highest enrolment is the course on ‘Corporate Law’ offered by the National Law University, Delhi.

There are ten courses of Biological Sciences and Bioengineering which are hosted by 10 institutes. The average enrolment in this category is 1411, and the course with the highest number of enrolments is ‘Immunology’

with an enrolment of 2167. There are 10 courses in Mathematics offered by 8 universities, the course having the greatest number of students, i.e., 3,006 being ‘Probability and Statistics’ offered by Mahatma Gandhi College, Kannur, Kerala. The average number of students enrolled in a Mathematics course is 1,534. Computer Science and Engineering courses are the most sought after in all of MOOC courses, with 14,691 as the average enrolment number in these courses. ‘The Art of C Programming’ being the most popular course in this category with 36362 enrolments.

There are 8 Multidisciplinary Courses offered by 7 Institutes. The average enrolment in these courses is 2056. ‘Academic Writing’ taught by the HNB Garhwal University has the maximum number of enrolments (7546), highlighting the importance of this course. In the category of Teacher Education, there are 6 courses taught by 5 Institutes. The average enrolment is 1959. The course with the highest number of enrolments is ‘B. Ed (English)-pedagogy of teaching English’ with 3161 enrolments. There are 4 Language courses taught by 3 institutes. The medium of instruction of these courses is in Hindi. ‘Hindi Bhasha ka Udbhavaur Vikas (The evolution and development of the Hindi language) taught by the Jawaharlal Nehru University has the highest number of enrolments. The average enrolment in these languages is 543.

Library and Information Services has two courses conducted by two institutes with an average enrolment of 1690. ‘Digital Library’ course taught by the Information and Library Network Centre, Gandhinagar has the maximum number of enrolments (1466).

The category of Arts has diverse courses taught by 4 institutes. The course with the highest number of enrolments is Basics of Photography, taught by Devi Ahilya Vishwavidyalaya, Indore, with an enrolment of 8519. Besides this, there are two courses related to music, namely Details of Natyashastra and Hindustani Raag Sangeet Level 3. There is also a course on Film Studies. The average enrolment in the Arts category is 2913. There are 3 courses in the field of Agriculture and Food Engineering run by three institutes with an average enrolment of 3,307. ‘Food Microbiology and Food Safety’ has the highest number of enrolments of 3617.

The category of Chemistry has 4 courses. All of them are conducted by the Maharaja Sayajirao University, Baroda. The average enrolment is 1769. The Metallurgy, Material Science, and Mining category have 2 courses that are taught by Dr.Harisingh Gaur Vishwavidyalay, Sagar. The average enrolment is 575. There is only one course, ‘City and Metropolitan Planning’ in Architecture and Planning, that is taught by the School of Planning and Architecture in New Delhi with an enrolment of 2096. Applied Sciences has only one course titled ‘Functional Foods and Nutraceuticals’ taught by the Rashtrasant Tukadoji Maharaj Nagpur University. This course is rerun quite often in different cycles of the MOOC. The course on Solid and Hazardous Waste Management taught by the Central University of Punjab in Bhatinda has an enrolment of 3541. It has been ranked as one among the world’s top 10 MOOCs courses [11]. See figure 5 to see the average enrolment in each course and figure 6, which shows the categories of MOOC Courses.

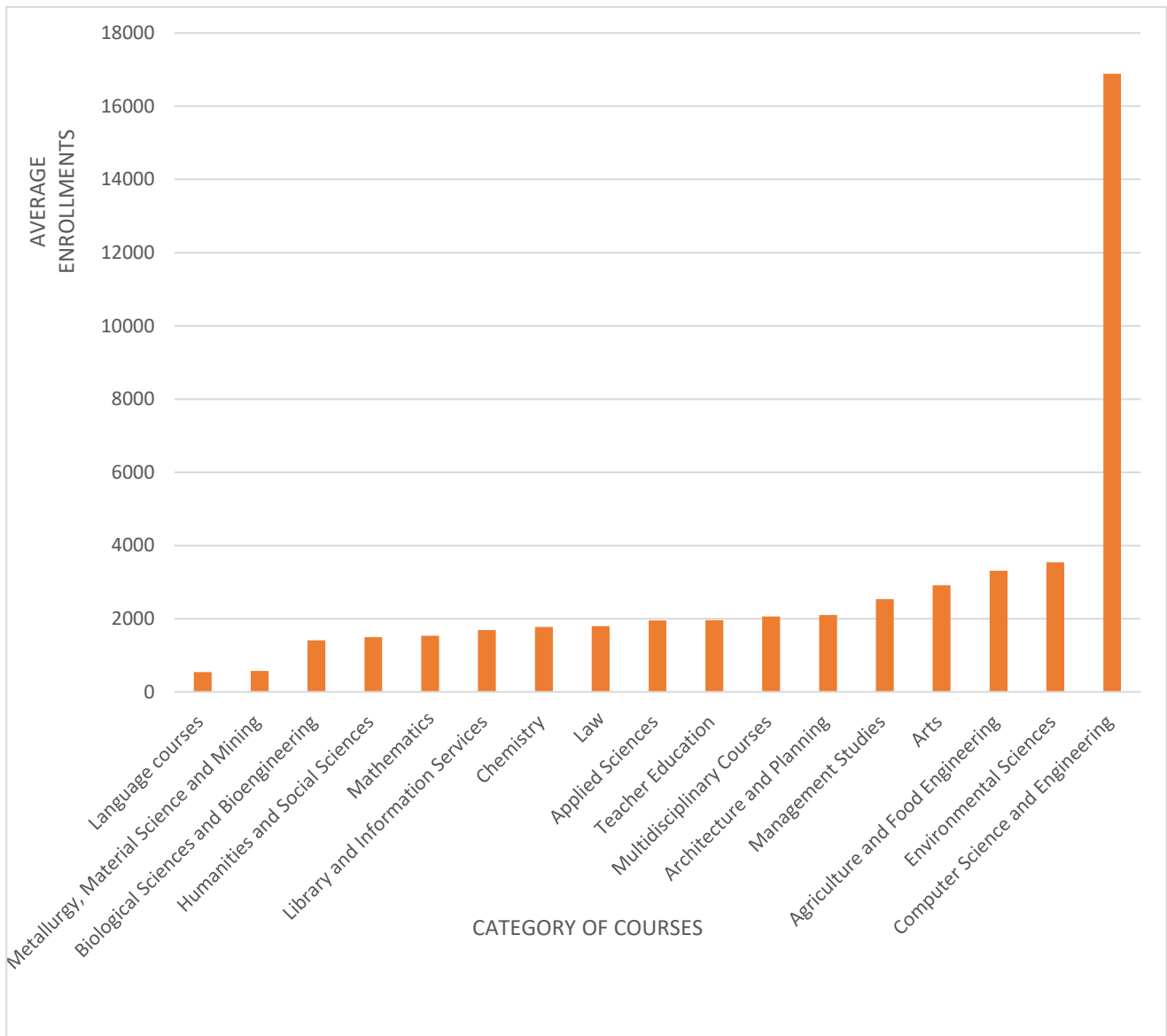


Fig. 5 Average Enrolment in Course Categories



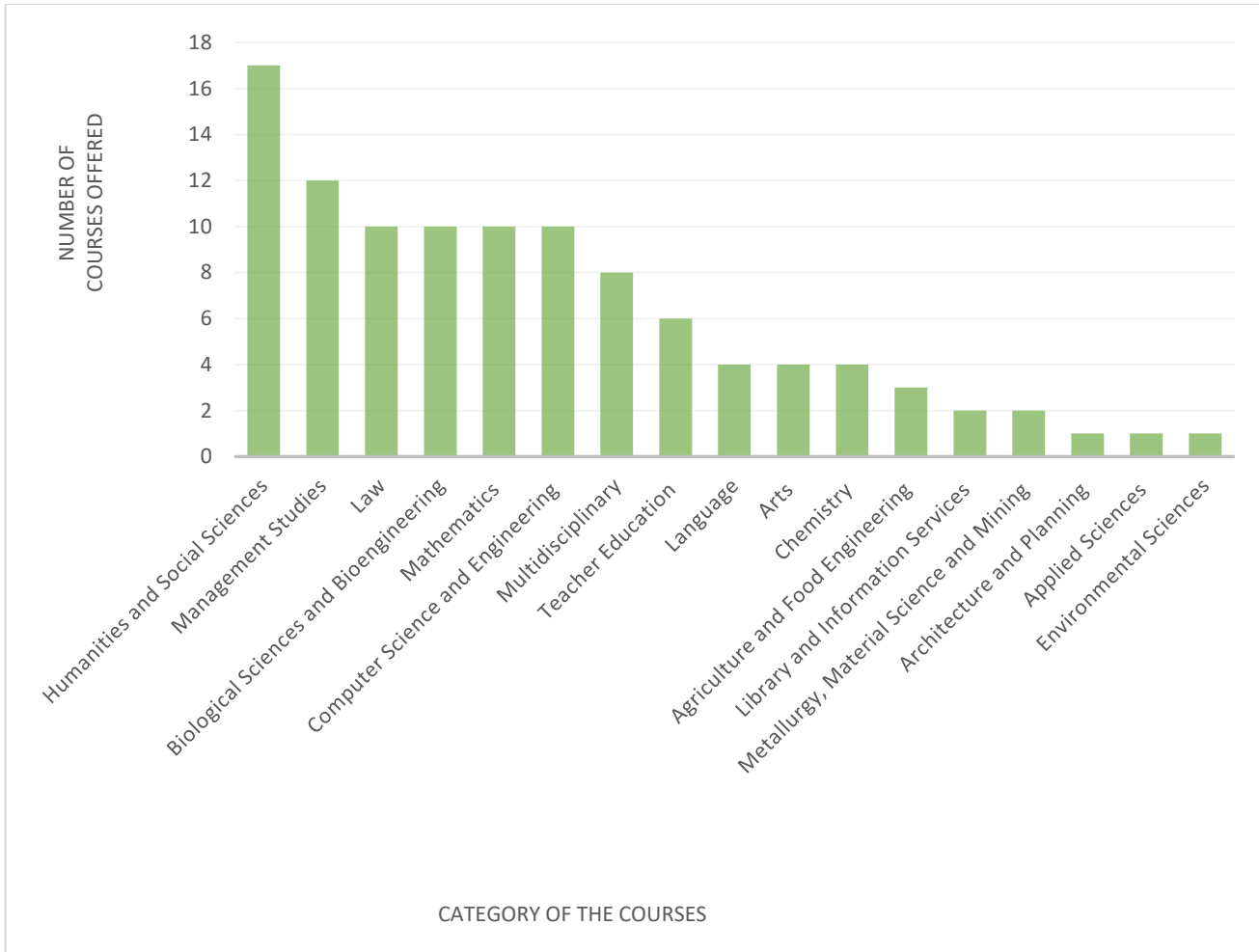


Fig. 6 Categories of Courses offered by CEC on the SWAYAM Portal

**D. Top 10 Courses**

If we analyze the top 10 courses of the January 2020 Academic cycle on the basis of enrolment, we see that the maximum number of enrolments are in courses pertaining to the field of Computer Science and Engineering. Information technology-related courses are extremely popular on the SWAYAM portal. It can be clearly observed that almost all of the courses (except academic writing) are technology-driven. Since almost all the activities these days are largely digitally driven, it gives all the more reason to understand the intricacies of the technological world and the various software associated with it. Courses related to Information Technology are extremely sought after among these CEC Courses. The average enrolment in these courses numbers at 13460 as compared to 2954 for all the CEC Courses. Other than Course in Information Technology, which is an introductory Computer course for beginners, all these courses are advanced in terms of content taught. The target audience for these courses in Science and Engineering students of the undergraduate and postgraduate levels. Particularly noteworthy is the growth of coding-related courses such as The Art of C Programming, Cyber Security, Design and Analysis of Algorithm, Software Engineering, and Computer Networks. The Art of C

Programming course taught by the University of Calicut is the most popular CEC course with more than thirty-six thousand student-enrolments. ‘C’ is a very important and prominent coding language that is used in making operating systems software and used as a base to develop another coding language. Python also is a high-level programming language that is designed in C and hence is a very popular course. Moreover, these courses provide a possibility for alternative sources of employment and also specialization for professionals within their respective fields. According to the TIOBE Index, the language C is the most popular coding language as of January 2021 on the basis of search engine data from Google, Bing, and Yahoo and also from YouTube searches [14].

But as we say that every positive brings certain negative with it, the growing technological usage also has its adverse implications. With the consistent usage of digital means, there has been an uprising trend of crimes in cyberspace. Hacking, phishing, and data theft have become so common these days that every user of technology has to remain at par with maintaining security. Cybersecurity is extremely significant these days, and therefore, it also finds its place in the list of top courses. The course on ‘Artificial Intelligence’ taught by Gujarat Law Society

University is also a popular course having an enrolment of 15714 students. AI techniques have experienced a resurgence following concurrent advances in computer power, handling large amounts of data, and solving many challenges in computer science. The growing importance of Artificial Intelligence in the areas of e-commerce, security and surveillance, internet algorithms, targeted advertising on the internet, the automobile industry, and numerous other spheres must be an important reason for the popularity of this course. The course on animations offered by Banaras Hindu University also shows high enrolment figures of 19384. The growing consumption of animation and usage of VFX at length in moviemaking, cartoons, advertisements, etc., is impossible to be ignored. The amplifying competition between these sectors to turn more and more creative and attract huge audience cements the base of the derivation of the fact that this course has a popular demand. One of the important features to highlight here is that this course is not taught in any degree or

curriculum, rather this is a technology-driven course that is learned additionally with negligible relation to curriculum complexities; thus, learning this course also comes with an added advantage of grabbing employment opportunity on the basis of creativity.

A course in academic writing can be opted by people of all ages and disciplines, as it serves as a tool of communication that conveys acquired knowledge in a specific field of study. It is a science and art as well to present any work in an easy and effective way. This particular course offered by Hemvati Nandan Bahuguna, Garhwal University (Central University), has seen an enrolment of 7564 in the January- July 2020 cycle. In the first cycle in January- July 2019, the course got a tremendous response, with 12500 students from 80 different countries enrolling for the course. The course also got maximum registrations for the examination [14]. Figure 7 depicts this in the form of a bar diagram.

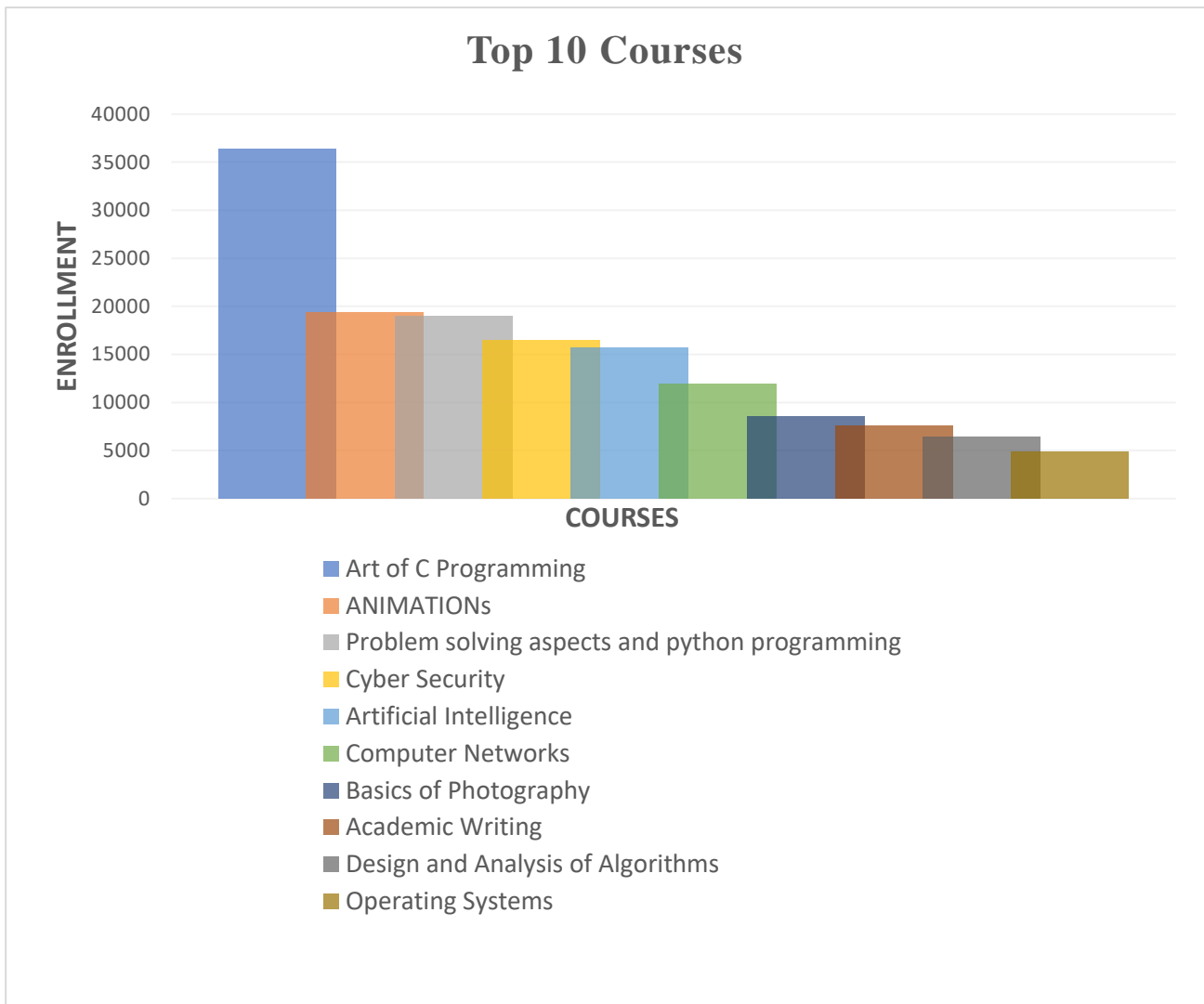


Fig. 7 Top 10 Courses



## VI. CONCLUSION

The courses offered by CEC on the SWAYAM are without a doubt extremely beneficial to students of Undergraduate and Postgraduate levels. Some of the courses are also for the perusal of people who wish to continue their education while simultaneously pursuing other vocations and also certificate and diploma courses for students who are already enrolled in other full-time courses. The courses are properly structured with articulate and well-researched material and rigorously planned guidelines to produce courses. There is no limitation to the number of students taking these MOOCs courses. Best of faculty and teaching is available to all, at any place, any time, and at a marginal fee.

MOOCs have gained a lot of popularity in the recent past. However, a number of challenges need to be addressed. A huge number of students enroll for these courses; however, the dropout rate is quite high. The number of students who give examinations in order to gain certificates for the courses is marginal. This is despite the fact that the fees for getting a certificate are minimal. Mostly the learners' drop out of the course as they find the courses either too difficult (advanced) or not suitable to help them scoring grades in University examinations.

Internet connectivity can also be seen as a deterrent for students to properly gain access to e-resources available on SWAYAM. The average connection speed in India is 6.5 Mbit/s. Rural penetration of SWAYAM is a challenge since 70 percent of the households do not have internet connections. In India, there is disparity among the states with regard to an internet connection with states like Jharkhand, Bihar, Andhra Pradesh, Telangana, West Bengal, Assam having low internet penetration [16].

The cost of developing these courses and the maintenance of software is another challenge. Most universities require a studio set-up or a mass-communication center. The language of the mode of instruction is mostly English, and options for other languages remain limited. Students from all over the country apply for these courses, and hence, transcriptions and materials should be made available in varied languages.

For science courses, practicals in laboratories cannot be held online, and hence, that remains a limitation. Another important aspect of education that is face-to-face interaction with teachers and peers, is not possible through MOOCs.

However, in the last few years, the popularity of MOOCs in India, particularly SWAYAM, has only increased due to its accessibility. SWAYAM has finalized a credit framework that would allow the transfer of credits between institutions. University Grants Commission (UGC) is trying to establish local chapters in 100 NIRF

ranked Universities to initiate credit transfer of courses. All 133 Universities have accepted credit transfer, of which 38 have already approved it. During the worldwide pandemic, these online courses, from being an alternate mode of education, are moving towards becoming a major mode of education/training programs. Keeping the pandemic situation in mind, UGC has doubled the academic credit limit of online courses to 40%. A great future lies ahead for these MOOCs, and it can be said that online education can go a long way in revolutionizing and reforming the lives of learners in India and across the entire world. It is indeed a promising way to the progress and development of society in future times to come.

## REFERENCES

- [1] Pappano, L. Massive Open Online Courses Are Multiplying at a Rapid Pace. *The New York Times*. Retrieved from (11)(2012). <https://www.nytimes.com>
- [2] T.C.S. (n.d.). Dr. Gautam Schroff. <https://www.tcs.com/content/dam/tcs/pdf/discover-tcs/Research-and-Innovation/Research-GautamShroff-Publications-010219-1.pdf>
- [3] Trehan, S., Sanzgiri, J., Wang, R., & Joshi, R. M. Critical discussions on the Massive Open Online Course (MOOC) in India and China. *International Journal of Education and Development Using Information and Communication Technology (IJEDICT)*, 13(2) (2017). 141–165. Retrieved from <https://files.eric.ed.gov/fulltext/EJ1153318.pdf>
- [4] About | mooKIT. (n.d.). Retrieved, (2020), from <https://www.mookit.in/about>
- [5] About NPTEL. (n.d.). Retrieved (2000), from [https://nptel.ac.in/about\\_nptel.html](https://nptel.ac.in/about_nptel.html)
- [6] About Swayam. (n.d.). Retrieved (2020), from <https://swayam.gov.in/about>
- [7] Rapaka, K., Microsoft & AICTE signed an agreement to build an app for the HRD ministry's SWAYAM platform. *Jagranjosh.Com*. Retrieved from <https://www.jagranjosh.com>, (2016).
- [8] National Coordinators. (n.d.). Retrieved December 1, , from [https://swayam.gov.in/nc\\_details/](https://swayam.gov.in/nc_details/),(2000).
- [9] Consortium for Educational Communication. CEC Annual Report (2017-18) (6) (2018). CEC. Retrieved from <https://www.cecindia.org/reportpdf/1559036794AnnualReport2017-2018.pdf>
- [10] University Grants commission: Inter-University Centers (IUC). (n.d.). Retrieved from <https://www.ugc.ac.in/page/C-E-C.aspx>
- [11] Consortium for Educational Communication., September). CEC Annual Report (2018-19) (7). CEC. Retrieved from <https://www.cec-india.org/reportpdf/1591961282AnnualReport-2018-19.pdf>
- [12] Department of Higher Education, Ministry of Human Resource Development, Government of India. Guidelines for Developing Online Courses on Swayam (1) (2017) <https://swayam.gov.in/> .
- [13] National Law University Delhi- MOOCs. (n.d.). Retrieved (2021), from <http://nludelhi.ac.in/moocs.aspx>
- [14] TIOBE Index for January (2021) (n.d.). Retrieved from <https://www.tiobe.com/tiobe-index/>
- [15] Sood, J. K., CEC NEWS. CEC Newsletter, 21(3)(2020) . Retrieved from <http://cec.nic.in>
- [16] Sharma N., Kansal A., Lakhnupal J., Bhasin A., Mathur P., Kapoor U., Gahlout A., Mirza A. & Kaicker A., Graduate teaching during COVID-19 induced lockdown. *International Journal of Indian Psychology*, 8(3)(2020) 1496-1513. DIP:18.01.153/20200803, DOI:10.25215/0803.153.