International Qualifications Assessment Service (IQAS)

Alberta Employment, Immigration and Industry

INTERNATIONAL EDUCATION GUIDE
Republic of India

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Country Overview

Land

Situated in South Asia in the Northern Hemisphere, India occupies portions of the Asian mainland and the entire Indian Peninsula. It borders on Pakistan to the west, China, Nepal and Bhutan to the north, and Bangladesh and Myanmar (Burma) to the east. Along its 5,422 kilometres of coastline, the Indian mainland faces the Arabian Sea to the west, the Indian Ocean to the south, and the Bay of Bengal to the east. India also has two island groups, the Lakshadweep Islands in the Arabian Sea and the Andaman and Nicobar Islands in the Bay of Bengal. With a total land area of about 3 million square kilometres, or slightly less than one-third the size of Canada, India is the seventh largest country in the world. The national capital is New Delhi. India has a single time zone, which is 5.5 hours ahead of Greenwich Mean Time (GMT+5.5).

Figure 1. Map of South Asia[1]

India has three main geological regions: the Himalayas, the Indo-Gangetic Plain, and the Peninsula. The Himalayas and the Indo-Gangetic Plain are known as North India, and the Peninsula as South India. The Himalayan mountain region extends along the northern and eastern borders. Kanchenjunga, at 8,598 metres, stands at the world's third highest peak after Mount Everest and K2. South of the Himalayas is the Gangetic Plain, a belt of fertile, densely populated alluvial lowlands. It is formed by the Ganges (known in India as Ganga) and its tributaries, which drain the southern slopes of the Himalayas. The Ganges is considered the holiest of the Indian rivers. The other two main rivers that flow through North India are the Brahmaputra and Indus (from which India derives its name). The Peninsula lies south of the plains and includes mountain ranges, plateaus, and fertile seashores.

India is a vast country located mostly in the tropical and subtropical regions. It has a diverse climate consisting roughly of four seasons: winter (December to February), hot and dry summer (March to May), the rainy monsoon season (June to September), and the post-monsoon season (October to November). Average rainfall is between 1,000 to 1,500 millimetres per year. In New Delhi, average temperature ranges from 26 to 41°C in May and 8 to 23°C in December.

People and Languages

With almost 1.1 billion people, or 17 percent of the world's population[2], India is the second most populous country after China. Around 70 percent of the population live in rural areas. There are 35 cities with more than a million people, the three biggest ones being the port city of Mumbai (or Bombay, 16.4 million); Kolkata (or Calcutta, 13.2 million), a commercial and manufacturing centre in East India; and the national capital, New Delhi (12.8 million). The current birth rate is estimated at 2.20%, compared with 2.54% in 2001. Life expectancy for the whole population is 64.7 years.

The people of India have great ethnic, cultural and linguistic diversity. Seventy-two percent of the population is Indo-Aryan, 25 percent Dravidian, and three percent Mongoloid and others. The government also identifies about eight percent of the population as tribal in a list of over 300 "Scheduled Tribes". Religion plays an important role in India, where Hinduism, Buddhism and Jainism originated. The Indian Constitution confers religious freedom for individuals and prohibits religious discrimination. According to the 2001 census, about 81.4 percent of the population is Hindu, 12.4 percent Muslim, 2.3 percent Christian, 1.9 percent Sikh, 0.8 percent Buddhist, 0.4 percent Jain, and 0.7 percent others.[3] Great differences exist among the Hindu majority, notably between the devotees of the god Vishnu (the Preserver) and devotees of the god Shiva (the Destroyer). The Muslim population, divided into the two main branches of Sunni and Shia, is concentrated in North India. In the state of Jammu and Kashmir, more than two-thirds of the population is Muslim.

The Hindu caste system, though illegal, is still widely practiced, especially in rural areas. A caste is a social class to which a person belongs at birth, and one can often tell a

person's caste by his or her last name. All castes are loosely grouped into four classes: the Brahmans (members of the social and cultural elite, including priests and scholars), the Kshatriyas (warriors and rulers, responsible for safeguarding peace and social justice), the Vaisyas (farmers, herders, merchants, and traders), and the Sudras (labourers and artisans). These classes are further divided into hundreds of subcategories, some of which only exist in specific areas. Today castes no longer correspond to professions, but most people still marry within their own caste. About 16 percent of the population are people who rank below the lowest caste, the "Untouchables", for which the legal term is "Scheduled Castes". Though the caste system is rooted in the Hindu religion, caste-like categories also exist in some non-Hindu communities.

India is home to hundreds of languages, most of which belong to either the Indo-European or the Dravidian language family. These two language families are vastly different in construction and adopt a variety of written scripts. About 80 percent of the population speak Hindi or other Indo-European languages with their roots in Sanskrit, the language of Hindu religious texts. Around 18 percent of Indians, mostly in South India, speak Dravidian languages. Tamil, the oldest known Dravidian language, has a substantial body of classical literature dating back to the first century AD.

Hindi is the official language and the most commonly spoken. It uses the Devanagari script, which is pronounced as written. There are 11 vowels and 40 consonants. Hindi has its roots in Sanskrit and has also borrowed words from English and Persian. Examples of English words of Hindi origin include *bungalow*, *dinghy*, *guru*, *khaki*, *pyjamas*, *shampoo*, and *veranda*. Hindi is closely related to Urdu, spoken mostly by Muslims. The two languages have virtually identical vocabulary and grammar, though Urdu is written in the Persian script.

Besides Hindi, English also has official status as an "associate language" and is widely used in business and politics. In most of the country, both Hindi and English are taught in schools. The Indian national census lists 114 languages that are further categorized into 216 dialects. A total of 22 languages are legally recognized by the Constitution for various political, educational, and other purposes: Assamese, Bengali, Bodo, Dogri, Gujarati, Hindi, Kannada, Kashmiri, Konkani, Maithali, Malayalam, Manipuri, Marathi, Nepali, Oriya, Punjabi, Sanskrit, Santhali, Sindhi, Tamil, Telugu, and Urdu. The most commonly spoken languages include Hindi (40.2 percent of the population), Bengali (8.3 percent), Telugu (7.9 percent), Marathi (7.5 percent), and Tamil (6.3 percent). Many Indians, especially those who live in urban areas or near state borders, speak more than one language.

History

As one of the world's great ancient civilizations, India encompassed the entire South Asian subcontinent, including present-day Pakistan and Bangladesh. Throughout Indian history, many outsiders came to settle, trade, or conquer. These included, among others, Greeks under Alexander the Great, Mongols under Genghis Khan, Turkic traders and

invaders, and the British and other European colonists. India not only survived such intrusions but was able to assimilate much of the external ideas and influences as well as disseminate its civilization to Southeast Asia, the Middle East and beyond.

Urbanization and trade began in the Indus River Valley around 3000 BC. Starting from 2000 BC the Aryans, a nomadic people from Central Asia, migrated to India and brought with them an early form of Sanskrit language, a tiered social system based on ethnicity and occupation, and the Hindu religion. The political and social change that ensued is captured in the two great Indian epics, the Ramayana and the Mahabharata. Toward the end of the Aryan rule in the 6th century BC, two new religions emerged: Buddhism under Gautama Buddha and Jainism under Vardhaman Mahavira.

From the coming of the Aryans to the arrival of the Europeans at the end of the 15th century, numerous empires ruled various portions of the subcontinent. Prominent among the early great powers were the Mauryan Empire (326-200 BC) and the Gupta Empire (AD 320-550). Islamic influence began with the Arab invasion in 711 and lasted for the next ten centuries. During this period, Islamic culture, education and religion flourished. A substantial minority of Indians converted to Islam. From the 13th to the 15th century Turkic rulers known as Delhi Sultanate ruled much of India. They were succeeded by the Mughal Empire, founded in 1526 by Babur, a descendant of Tamerlane, the Mongol conqueror who invaded India and sacked Delhi in 1398. One Mughal emperor, Shah Jahan, ordered the construction of the incomparable Taj Mahal in memory of his favourite wife. The rule of the Mughal emperors was greatly weakened by the early 18th century and formally ended in 1858.

Indian history entered a new phase when the Portuguese explorer Vasco da Gama sailed across the Indian Ocean into the harbour of Calicut in 1498. The Portuguese were followed by the Dutch, the French and the British. The Europeans set up commercial companies, such as the British East India Company and the Dutch East India Company, to trade in spices and then textiles. To compete against one another, they engaged in political, economic and military alignments with the Mughal rulers. By the late 18th century the British had become the dominant power in the subcontinent, defeating the French and reducing the Mughal emperor to a puppet ruler. The first British governor-general of India took office in 1774.

While the British ruled India to serve their colonial interests, often to the detriment of the local economy and the livelihood of the general populace, they did bring a measure of stability and modernization to the subcontinent. A civil service system was introduced, and English became the language of government in 1835. The period also saw the development of Western-style education, including the establishment of universities modelled after the University of London. Revolt against the British rule began with the Sepoy Rebellion of 1857 to 1858, when Indian sepoys (soldiers) in the service of the East Indian Company mutinied and tried to restore the rule of the Mughal emperor. After crushing the rebellion, the British government abolished the East Indian Company, banished the last Mughal emperor, and assumed direct control of India.

The founding of the Indian National Congress in 1885 marked the rise of the independence movement. Led by Mahatma Gandhi and Jawaharlal Nehru, the National Congress launched its non-violent resistance to British rule in 1920. On August 15, 1947, two years after the end of World War II, the subcontinent was partitioned into India and Pakistan (comprising present-day Pakistan and Bangladesh) as independent dominions of the British Commonwealth of Nations. Jawaharlal Nehru became the first Prime Minister of India. Mass migration and great communal strife and violence ensued as millions of Hindus, Muslims and Sikhs streamed across the newly drawn borders.

At the time of its independence in 1947, India was an underdeveloped country with a large and growing population, many of whom lived in abject poverty. Since then it has achieved phenomenal growth to become an Asian economic powerhouse and an influential player in international affairs. The Constitution of India that came into effect in 1950 designates the country as a federal union of states with a parliamentary system and guarantees its citizens a set of fundamental rights, including freedom of speech, assembly and association. Except for a short period of martial law (1975-1977), India has maintained its democratic political system. It has become self-sufficient in food production, achieved substantial industrialization, and developed a highly successful information technology sector. Since the 1990s, it has maintained an annual GDP growth of 4-7 percent. On a purchasing power parity basis, it stands as the fourth largest economy in the world after the United States, China and Japan.[4]

Administration

India is a federal republic. The central government, also known as the union government, is separated into the executive, legislative, and judicial branches. India has both a Prime Minister and a President. Members of parliament and state legislative assemblies elect the President, who serves a five-year term and whose duties are largely ceremonial. The Prime Minister is the leader of the majority party in parliament but is formally appointed by the President. The Council of Ministers headed by the Prime Minister wields executive power at the national level. The current Prime Minister is Manmohan Singh, whose National Congress Party won the election in 2004.

The Indian parliament is a bicameral legislature consisting of a lower house (Lok Sabha, House of the People) and an upper house (Rajya Sabha, Council of States). The 545 members of the lower house (543 popularly elected and two appointed by the President) serve five-year terms. The 245 members of the upper house (233 elected by state and union territory assemblies and 12 appointed by the President) serve six-year terms, with one-third of members up for election every two years. The parliament passes laws on matters specified in the Constitution, including Constitutional amendments. The judiciary of India is composed of the Supreme Court at the national level, high courts at the state level and a hierarchy of subordinate courts.

India has 28 states and seven union territories (see following table), which are further divided into 601 districts. State boundaries, which underwent a major reorganization in

1956, often reflect the language, culture and history of population groups. The Constitution stipulates the division of responsibilities between the national and state governments. The national government has exclusive power in certain areas such as defense, foreign affairs, and banking, while the state governments are responsible for areas such as healthcare and agriculture. Some areas such as education fall into the "concurrent list", meaning they are the joint responsibility of the national and state governments. The national government has greater control over union territories, which are usually smaller than states in terms of land area and population. In times of emergency, the national government has the authority to assume control of the states, which it has done many times since 1947.

Table 1. States and Union Territories of India

States	Andhra Pradesh	Arunāchal Pradesh	Assam	West Bengal	Bihār	Chhattisgarh	Goa
	Gujarāt	Haryāna	Himāchal Pradesh	Jammu and Kashmīr	Jharkhand	Karnātaka	Kerala
	Madhya Pradesh	Mahārāshtra	Manipur	Meghalaya	Mizoram	Nagaland	Orissa
	Punjab	Rājasthān	Sikkim	Tamil Nādu	Tripura	Uttaranchal	Uttar Pradesh
Union Territories	Andaman and Nicobar Islands	Chandīgarh	Dādra and Nagar Haveli	Damān and Diu	Delhi	Lakshadweep	Pondicherry

Figure 2. National Flag and Emblem of India

The national flag of India has three horizontal bands in equal proportions, with saffron on the top, white in the middle, and green at the bottom. The saffron stands for courage, sacrifice, and renunciation; the white represents truth and purity; and the green signifies faith and fertility. The 24-spoke dark blue wheel in the centre is an ancient Buddhist symbol, the Dharma Chakra ("Wheel of Law"). The national emblem of India is an adaptation of the Lion of Sarnath, erected in the third century BC by King Ashoka the Great of the Mauryan Empire to mark the spot where Gautama Buddha first taught the new religion. Four lions (one of which is hidden from view), representing power, courage

and confidence, stand back to back on an abacus. The abacus is girded by four smaller sculpted animals separated by Wheels of Law. They are guardians of the four directions: the lion of the north, the elephant of the east, the horse of the south and the bull of the west. The motto inscribed below the abacus in Devanagari script means “truth alone triumphs”.

Canada and India have enjoyed a longstanding, wide-ranging relationship. India is one of the largest recipients of Canadian bilateral aid, which totalled $3.8 billion Canadian dollars in the past five decades. Over the years the two countries have developed strong economic, social and cultural ties. India is Canada’s second largest source country of immigrants, with over 33,000 people obtaining permanent resident status in 2005. There are an estimated one million Canadians of Indian origin.[5]

Historical Education Overview

Outline of Education System

Though the educational tradition in India dates back to several millennia ago, the current system has largely developed on the basis of the Western-style education from the British colonial period. Since it gained independence in 1947, India has seen huge growth in the number of institutions and enrolments. The education system has been expanded to reach a much larger part of the growing population, with a total of 888,000 educational institutions at all levels enrolling 179 million students. Progress has also been made against mass illiteracy, with the literacy rate reaching 65 percent in 2001 as compared with 52 percent in 1991 and 12 percent in 1947.

India is a federal republic comprising 28 states and seven union territories. According to the Constitutional amendment of 1976, education is the shared responsibility of the central and state governments. While the state governments are primarily responsible for administering both school and university education, the central government exerts its influence through education planning and policy at the national level. About one third of educational funding comes from the central government and the remaining two-thirds from the states. The specific roles of the central government include:

- National-level planning, e.g. through Five-Year Plans for national development and the National Policy on Education (NPE)
- Administration of education in the union territories
- Administration of central universities and all institutions declared by the Parliament to be of national importance
- Administration of central agencies and institutions for professional, vocational or technical training or for the promotion of special studies and research
- Coordination and maintenance of standards in higher and technical education
- Promotion of Hindi as the national language

The Department of Education of the central government administers education at the national level. The name and responsibilities of the Department of Education have changed several times since 1947. Currently education falls under the jurisdiction of two departments, the Department of School Education and Literacy and the Department of Higher Education, within the **Ministry of Human Resource Development**.

A number of central agencies assist the Department of Education in policy advice and coordination, research, examination, and certification of institutions.

- **Central Advisory Board of Education (CABE).** First established in 1920, it acts as the main advisory body for the Department of Education and plays a leading role in the development and monitoring of policies and programs. It consists of representatives from the central and state governments, universities, and the Parliament as well as prominent educators.
- **National Council of Educational Research and Training (NCERT).** Established in 1961, it advises the central and state governments on academic matters relating to

school education. It also develops the curricula, syllabi and textbooks for schools.

- **All India Council for Technical Education (AICTE).** Established in 1945, it is responsible for planning, development and maintenance of standards of technical education.
- **Central Board of Secondary Education (CBSE).** It deals with activities related to affiliation, academic matters and examinations, and introduces innovations and reforms at the secondary and higher secondary levels in order to bring education to international standards. There are 8,278 schools affiliated to the board, with about 200 schools added each year.
- **University Grants Commission (UGC)**. Established in 1945 as the University Grants Committee, it allocates grants to universities for their maintenance and development and oversees their teaching and research standards.
- **Association of Indian Universities (AIU)**. First established in 1925, it is an umbrella organization bringing together university administrators and academicians from across India to exchange views and discuss educational issues. Its objectives include coordinating the work of universities, establishing equivalence of degrees between Indian and foreign universities and helping universities obtain recognition for degrees, diplomas and examinations within India.

The state ministry or department of education administers education at the state level. District boards of education administer education at the district level and formulate plans for building facilities, developing instructional material, and training teachers. There are also grassroots organizations such as village education committees, which are responsible for the enrolment and retention of children in schools.

As school and higher education developed and evolved independently at the state level, the educational structure varied over the years and across states. Currently all the states and union territories have adopted the 10+2 school system advocated by the central government. This comprises ten years of elementary and secondary education followed by two years of higher (or senior) secondary education. However, there remain variations in how the first ten years break down into the primary, upper primary (or middle) and secondary stages, the most common pattern being 5+3+2. The minimum age for admission to Class 1 is usually five or six. School education from Classes 1 to 12 is tuition free in most states and union territories.

The mother tongue or regional language is the medium of instruction at the primary stage. Teaching of Hindi is compulsory in most of the non-Hindi speaking states and union territories. Teaching of English is compulsory, usually from Classes 6 to 10, except for the State of Bihār. Public examinations are conducted at the end of Class 10 and Class 12 by the State Boards of Secondary and Higher Secondary Education or the Central Board of Secondary Education.

The school year has a minimum of 200 work days. It usually begins in July and ends in April, with a long summer vacation. At the primary stage, each school day lasts five hours, including four hours of instruction. At the upper primary, secondary and higher secondary stages, a school day lasts six hours, including five hours of instruction. Each

class session lasts about 40 minutes.

Higher education is provided by universities and colleges. Most bachelor's degree programs are three years in length, though degrees in professional fields such as engineering take up to five years to complete. Master's degree programs, either research- or coursework-based, normally last two years. After completion of a master's degree, one can take a one-year pre-doctoral program that awards the Master of Philosophy degree (M.Phil). A doctor's degree can be earned at least two years after the M.Phil or three or more years after the master's degree.

Traditional Education (before the 19th century)

Dating back well before the first millennium B.C., education in ancient India was concerned mainly with the oral transmission of Hindu sacred texts known as Vedas. It tended to be monopolized by the upper castes, especially the Brahmans who were training to be priests. Secular and military education was also available to the princely class.

Though Buddhism never became a dominant religion in India, it exerted a profound influence on education. Buddhist education originated in the late fifth century B.C. Apart from theology, a wide range of subjects were taught, including philosophy, arts, astronomy, mathematics and medicine. Education was open to people of all castes. Several world-famous institutions arose out of monasteries in Nalanda, Vikramshila and Taxila. The institution at Nalanda flourished from the 5th to the 13th century and at one time boasted ten thousand students and teachers from all over India as well as scholars from China, Korea and other parts of the world.

The Muslim period in India saw the establishment of many elementary and secondary schools as well as "madrassas"[6], Islamic institutions of higher learning. The madrassas provided both secular and religious training. While the Hindu institutions taught in Sanskrit, the madrassas adopted Arabic and Persian as languages of instruction.

The British Period (early 19th century-1947)

The education system of modern India has its roots in the British rule. In 1813 the British East India Company assumed responsibility for the education of Indians. At that time there was a great controversy between supporters of indigenous education and advocators of Western learning. *Macaulay's Minute on Education* of 1835 argued for the promotion of Western learning through the medium of English, with a view to forming "a class who may be interpreters between us and the millions whom we govern; a class of persons, Indian in blood and colour, but English in tastes, in opinions, in morals and intellect".[7] The Governor General of India accepted the proposal and ordered all education funds to be allocated for teaching English literature and science to the native population.

A lasting legacy of the British rule in India was the development of modern universities. 1817 saw the establishment of India's first Western-style college, the Hindu College in Calcutta, later renamed Presidency College to admit non-Hindu students. In 1857 three universities were created at Bombay, Calcutta and Madras. The Punjab University at Lahore (in present-day Pakistan) was established in 1882, and the University of Allahabad in 1887. Modelled after the University of London, these early universities mainly functioned as examining and degree-granting bodies; teaching took place at the affiliated colleges. The *Indian Universities Act* of 1904 granted universities the right of teaching along with the right of conducting examinations. Some of the oldest, affiliating universities gradually established teaching departments, and a number of residential and teaching universities such as Banaras Hindu University and the University of Mysore were set up. At the time of independence in 1947, India had 19 universities and 491 colleges with a total enrolment of 229,000.

The Government of India under the British rule, which took over control of India from the East India Company in 1858, appointed a number of commissions to study education and formulated policies based on their recommendations. For example, while rejecting the idea of compulsory primary education, the government resolution on educational policy of 1913 acknowledged that literacy and primary education should have a predominant claim on public funds, and proposed to double the 4.5-million enrolment of public primary schools in the "not distant future". As it turned out, few of the recommendations and policies were fully implemented, in part due to the two World Wars and the Great Depression. Nevertheless, an educational administrative structure was developed covering elementary and secondary as well as higher education. The *Government of India Act* of 1935 clarified the role of the central and state governments in education: most educational activities fell under the jurisdiction of state governments, with the central government responsible for the national library and museums, the preservation of ancient monuments, the Banaras Hindu University and the Aligarh Muslim University, and education in centrally administered areas.

After Independence (1947-)

At the time of independence in 1947 the education system of India faced many challenges. Only 12 percent of the adult population was literate. About 44.5 percent of children aged six to 11 and 10.8 percent of children aged 11 to 17 were enrolled in schools in 1950-51. The enrolment rate of girls was much lower than boys, as girls typically dropped out of school before their early teens to work for their family. Though education was recognized as crucial to national development in the Constitution of India, it remained underfunded for many years. The First Five-Year Plan (1951/52-1955/56) allocated only 7.2 percent of public expenditure to education; the level dropped to 5.8 percent in the Second Five-Year Plan and to as low as 2.6 percent in the Sixth Five-Year Plan (1980-85) before rising to 13 percent in 2001.

Constitution of India

The Constitution of India that came into effect in 1950 included a number of provisions concerning education, such as:

- The government shall, within a period of 10 years, provide free and compulsory education for all children until the age of 14.
- No citizen shall be denied admission into any educational institution maintained by the government or receiving government aids on grounds only of religion, race, caste, and language.
- All minorities, whether based on religion or language, shall have the right to establish and administer educational institutions of their choice.
- The government shall promote the educational interests of the "weaker sections of the people", especially the Scheduled Castes and Scheduled Tribes.
- The official language shall be Hindi in Devanagari script.

The Constitution also stipulates the responsibilities of the central and state governments in the so-called union list, state list and concurrent list. With education on the state list, the state governments were to play a major role, especially in the elementary and secondary stages. Education was subsequently moved to the concurrent list in the Constitutional amendment of 1976, with the central government charged with specific duties such as maintaining standards in higher and technical education and managing universities and scientific and technical institutions declared by Parliament to be of national importance.

National Policy on Education, 1968

The Education Commission of 1964-1966, the sixth such commission, did not limit its inquiry to a specific sector or aspect of education but undertook a comprehensive review of the entire education system in India for the first time. Its report identified several aspects of educational development that needed to be addressed: The goal of free and compulsory education for all children up to 14 years of age was not attained; mass illiteracy continued to be immense; standards of secondary and university education were not raised adequately; secondary and university curricula were outdated, resulting in widespread unemployment among the educated even as the country suffered an acute shortage of skilled personnel in many sectors. In short, qualitative improvement in education had not kept pace with quantitative expansion.

In 1968 the central government, upon the education commission's recommendations, issued the National Policy on Education (NPE), a landmark document that formed the basis of educational reform and development in the next two decades. Some of the principles outlined in the 1968 NPE included:

- To equalize educational opportunity, providing better facilities in rural and backward areas and promoting the education of girls, the underprivileged classes and children with disabilities.
- To eventually develop a broadly uniform educational structure (10+2+3) in all parts of the country comprising 10 years of elementary and secondary education + 2 years of higher secondary education + 3 years of undergraduate education.
- To adopt the three-language formula for secondary and higher secondary education, which includes the study of a modern Indian language (preferably one of the southern languages) along with Hindi and English in the Hindi-speaking states, and the study of Hindi along with the regional language and English in the non-Hindi-speaking

states.

- To provide better access to secondary and higher secondary education, and to promote technical and vocational training at this stage covering a wide range of fields such as agriculture, industry, trade and commerce, medicine and public health, home management, arts and crafts, secretarial training, etc.
- To establish more universities while ensuring proper standards, and to strengthen postgraduate courses and research.
- To develop part-time and correspondence courses at the secondary, higher secondary and university levels and grant them the same status as full-time education.

Committee on Ten plus Two plus Three, 1973

The 10+2+3 structure put forward in the National Policy on Education of 1968 was discussed and endorsed by a number of national educational organizations including the Central Advisory Board of Education. A national committee was appointed by the Ministry of Education and Social Welfare to formulate practical measures for introducing the proposed structure all over the country. Some of its major recommendations included:

- The new educational structure should provide an opportunity for reorganizing the curriculum and raising the standard of education to make it internationally comparable.
- The curriculum for the elementary stage (Classes 1 to 8) as developed by the National Council of Educational Research and Training (NCERT) should be adopted all over the country with modification to suit local requirements, particularly in the lower classes.
- The secondary stage (Classes 9 and 10) is too early for any specialization and should instead provide for a good general education. The higher secondary stage should provide for two streams, the academic stream and the vocational stream. A vocational course may last from one to three years.
- There should be a public examination at the end of Class 10 and another at the end of Class 12 or at the completion of the vocational course, to be conducted by the State Board of Higher Secondary and Vocational Education (by whatever name it is called).

Constitutional Amendment, 1976

The Constitutional amendment of 1976, which moved education from the state list to the concurrent list, required the central government to assume a larger responsibility to reinforce the national and integrative character of education, to maintain quality and standards (including those of the teaching profession at all levels), to study and monitor the educational requirement of the country as a whole with regard to manpower for development, to cater to the needs of research and advanced study, to look after the international aspects of education, culture and human resource development and, in general, to promote excellence at all levels of the education throughout the country.

National Policy on Education, 1986

The National Policy on Education (NPE) of 1986 (revised in 1992) contained 12 sections and 157 paragraphs on different aspects of education, accompanied by a Plan of Action that assigned specific responsibilities for implementing and financing the policy. The 1986 NPE has served as a comprehensive policy framework for educational development

until the beginning of the 21st century. Some of its summaries and recommendations include:

- Most states have accepted the 10+2+3 structure. [It was fully implemented a couple of years later.] Regarding the first 10 years, the 5+3+2 pattern is recommended: 5 years of primary education plus 3 years of upper primary education plus 2 years of secondary education.
- The principles outlined in the 1968 NPE have not been fully implemented. Education still faces grave problems of quality, quantity, access and financial outlay.
- Due to socio-economic conditions, the school system does not reach all children. Non-formal education programs will be strengthened to cater for school dropouts, children from habitations without schools, and working children (especially girls) who cannot attend full-day schools.
- Children with special talent or aptitude should have the opportunity to proceed at a faster pace, e.g. by attending residential schools that recruit talented children from different parts of the country.
- Vocational courses are generally provided at the higher secondary stage but may be made available after Class 8. Vocational education will be expanded to cover 25 percent of higher secondary students by 2000. [However, only about five percent of students chose the vocational stream in higher secondary education in 2000.] Graduates of vocational courses will be given opportunities for employment and entry into general, technical and professional education through appropriate bridge courses.
- With 150 universities and 5,000 colleges, higher education development will focus on the consolidation of existing institutions in the coming years. In view of the mixed experiences with the system of affiliation, the establishment of autonomous colleges and autonomous departments within universities will be encouraged.
- The open learning system has been initiated to provide more opportunities for higher education. The India Gandhi National Open University, established in 1985, will be strengthened. It will also provide support to the establishment of open universities in the states.
- The Central Advisory Board of Education (CABE) will play a pivotal role in reviewing educational development, determining changes to improve the system and monitoring implementation. State governments may establish state advisory boards of education on the lines of CABE. District boards of education will also be created to manage education up to the higher secondary level.
- Education will be treated as a crucial area of investment for national development and survival. The level of investment has remained far below 6 percent of national income, the target laid down in the NPE 1968. Efforts will be made to ensure that during the Eighth Five-Year Plan (1991-1995) and onwards the outlay on education will uniformly exceed 6 percent of national income.

Reconstitution of Central Advisory Board of Education

After its tenure expired in March 1994, the Central Advisory Board of Education (CABE) was not reconstituted until 2004. As before, the board consists of nominated members representing various interests in addition to representatives from the central and state governments and the Parliament. Seven committees have been set up to deal with the following issues:

1. Free and Compulsory Education Bill and other issues related to elementary education
2. Girls education and the common school system
3. Universalisation of secondary education
4. Autonomy of higher education institutions
5. Integration of culture education in the school curriculum
6. Regulatory mechanism for textbooks and parallel textbooks taught in schools outside the government system
7. Financing of higher and technical education

Education Review and Planning in the Tenth Five-Year Plan (2002-07)

Established in March 1950, the Planning Commission of the Government of India formulates Five-Year Plans, which include comprehensive review and planning of educational development. The Tenth Five-Year Plan (2002-07) provides a review of educational progress at all levels over the past five decades.[8]

While literacy rate still varies considerably by region and gender, it has risen steadily over the years as the government realizes that the eradication of mass illiteracy not only promotes social justice but fosters economic growth and social stability.

Table 2. Literacy Rates 1951-2001

Year	Male	Female	Total
1951	24.95	7.93	16.67
1961	34.44	12.95	24.02
1971	39.45	18.69	29.45
1981	56.50	29.85	43.67
1991	64.13	39.29	52.21
2001	75.85	54.16	65.37

Though the Constitutional goal of universal education of children up to the age of 14 was not attained, the number and rate of enrolment in elementary education have shown substantial growth. Total enrolment at the primary level (Classes 1-5) grew from 19.16 million in 1950-51 to 113.61 million in 1999-2000. The growth at the upper primary level (Classes 6 to 8) in the same period was even more impressive, from 3.12 million to 42.06 million. The percentage share of girls in total enrolment of elementary education also rose significantly, from 28.1 to 43.6 percent. Though the total number of elementary school teachers reached 3.2 million in 1999-2000, an increase of more than five times, it did not keep pace with the increase of student numbers, and the teacher-pupil ratio worsened.

Table 3. Elementary Education Development, 1950-2000

Item \ Year		1950-1951	1999-2000
gross enrolment rate	primary	42.6	94.9
	upper primary	12.7	58.8
schools	primary	210,000	642,000
	upper primary	13,600	198,000
teachers		624,000	3.2 million
teacher-pupil ratio	primary	1:24	1:43
	upper primary	1:20	1:48

Secondary and higher secondary education (Classes 9-12) prepares young people aged 14 to 18 for employment or higher education. There has been no substantial change in the structure and organization of the secondary and higher secondary education since the National Policy on Education of 1986. Despite the growth in the number of schools, students and teachers, enrolment rate remained low, with slightly less than one third of the population in the 14-18 age group enrolled in secondary and higher secondary schools. The focus of the Tenth Five-Year Plan is therefore to meet the increased demand for secondary and higher secondary education by opening new schools, expanding the capacity of existing schools, upgrading of upper primary schools, and promoting distance education.

Table 4. Secondary and Higher Secondary Development, 1950-2000

Item \ Year	1950-51	1999-2000
schools	7,416	116,820
students	1,500,000	28.21 million
teachers	127,000	1,720,000

There has been significant growth in the number of higher education institutions in the past five decades. However, access and equity remains a serious issue, with only 6 percent of the 18-23 age group enrolled in a university or college. The government aims to increase the enrolment to 10 percent by the end of 2007. To help maintain quality and standards in the face of rapid expansion of higher education, the University Grants Commission established the National Assessment and Accreditation Council (NAAC) in 1994 as an independent national accreditation body.

Table 5. Higher Education Development, 1950-1999

Item \ Year	1950-1951	1998-1999
universities	30	238
colleges	750	11,089
students	263,000	7.4 million
teachers	24,000	342,000

Recent developments in higher education include the emergence of separate universities for science and technology and health sciences, and of autonomous colleges with the authority to design curricula, formulate admission policy and administer examinations.

Since the National Policy on Education of 1986, distance and open education has expanded. Dozens of universities offer correspondence courses. The Indira Gandhi National Open University offers 72 programs with a total enrolment of 1.2 million. A number of states have also set up their own open universities.

The success of technical and management education in India has contributed greatly to the country's economic growth by producing large numbers of highly skilled technical and management personnel. Prominent among the providers of technical and management education are the Indian Institutes of Technology (IITs), Indian Institutes of Management (IIMs), and Regional Engineering Colleges (RECs). In 2001-2002 there were 4,791 technical and management institutions approved by the All India Council of Technical Education (AICTE) with an annual intake of 6.7 million students, compared with only 99 technical and engineering colleges with an annual intake of 6,240 in 1947. Main objectives in technical and management education in the coming years include increasing intake, improving quality of education, promoting research in technology, faculty development, and modernization of the curriculum.

School Education

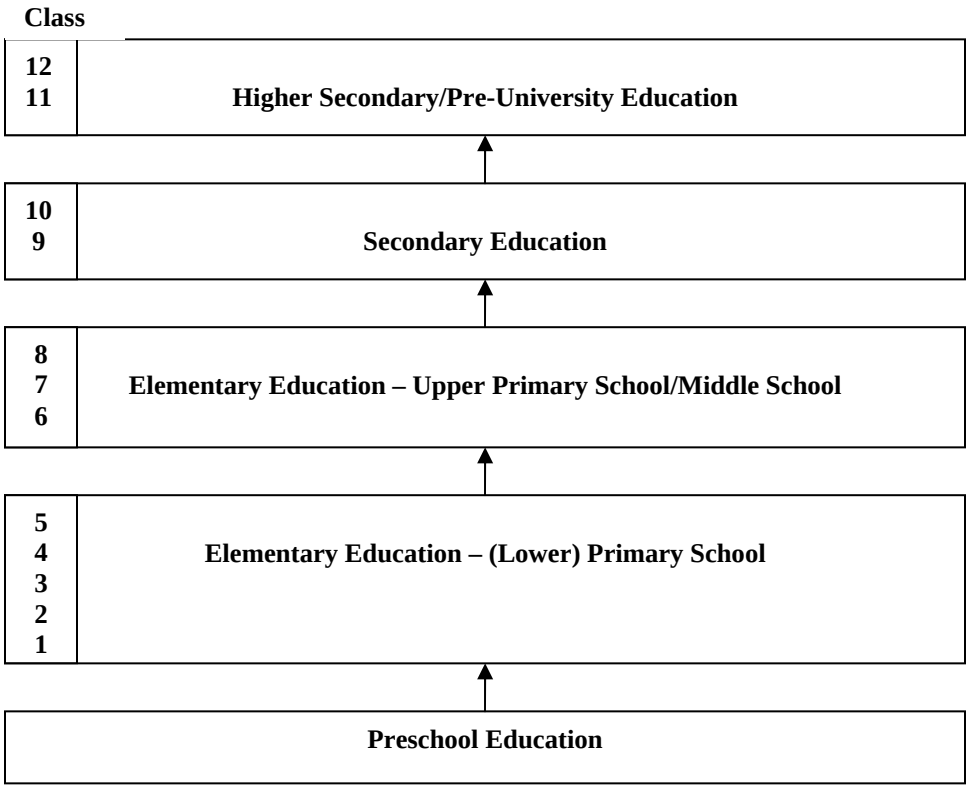
Overview

As school education in India developed at the state level, its structure varied over the years and across states. In the early years of independence, school education was either 12 years (10+2 or 11+1) or 11 years (8+3, 9+2 or 10+1), and in many states the last one or two years (often called intermediate or pre-university education) took place in colleges or universities. The current 12-year (10+2) system evolved in the 1970s and was fully implemented across the country in the late 1980s, following the National Policy on Education of 1986. It generally consists of

- 8 years of elementary school (Classes 1-8)
  - 5 years of (lower) primary school
  - 3 years of upper primary school/middle school
- 2 years of secondary school (Classes 9-10)
- 2 years of higher secondary school/pre-university (Classes 11-12)

Elementary education for children aged 6-14 is free and compulsory, with a gross enrolment ratio of 85 percent in 2003-2004. About one-third of children aged 14-18 attend secondary and higher secondary schools.

Figure 3. Outline of School Education System



Examinations

Secondary and higher secondary students sits a major examination at the end of each school year. The Class 9 and Class 11 examinations are conducted internally by the

schools. The Class 10 and Class 12 examinations are conducted externally by either a state board or one of the three All-India examining bodies. Students must pass the annual examination and meet the attendance requirements in order to proceed to next year's study. The certificates issued for passing the external examinations at the end of Class 10 and Class 12 are exit credentials representing the completion of secondary and higher secondary education respectively. Please refer to Appendix 1 for examples of names of school education certificates issued by the Central Board of Secondary Education (CBSE) and the state boards of Punjab and Tamil Nadu.

The Class 10 and Class 12 external examinations generally include five or six major subjects; a few subjects such as health and physical education, art education and work experience are assessed internally by the schools based on the cumulative record of the student during the year. To pass the external examination, students have to obtain the minimum pass mark for all the subjects; if a subject involves both theory and practical work, they must obtain the minimum pass mark for both in order to pass the subject. Those who have failed in one or two of the subjects may be allowed to take the compartment examination in the failed subjects. A student who is placed in compartment in Class 10 examination may be admitted provisionally to Class 11, with the admission to be confirmed or cancelled when the student passes or fails the compartment examination. Some boards also allow students to retake the examinations for improved grades.

External Examination Bodies

Both the state boards and the three All-India examining bodies administer the Class 10 and Class 12 external examinations. Which examination the students take is usually determined by the affiliation of their school. Most students attend state schools and sit state-administered examinations.

- **State Boards**. Each state has either two separate boards for secondary and higher secondary education respectively or one board for both. The state boards are responsible for administering school education in line with the national policy. They manage the schools, set the curriculum and syllabi, and administer benchmark examinations. The names of the state boards vary and may have changed over time. Please refer to Appendix 2 for a list of recognized state school education boards provided by the Ministry of Human Resource Development.
- **Central Board of Secondary Education (CBSE)**. It was first established in 1929 as the Board of High School and Intermediate Education and acquired its present name in 1952. With more than 8,000 affiliated schools, it sets the curriculum and conducts examinations for the All India/Delhi Secondary School Certificate (representing completion of Class 10) and All India/Delhi Senior School Certificate (representing completion of Class 12). Students do not have to be enrolled in an affiliated school to take the CBSE examinations. Those who have failed in the examination may reappear at a subsequent examination as a "private candidate".
- **Council for the Indian School Certificate Examinations (CISCE)**. It was first established in 1958 to administer the University of Cambridge Local Examinations Syndicate examinations, and began to conduct public examinations for school education in 1973. It sets the curriculum and conducts examinations for the Indian Certificate of Secondary Education (representing completion of Class 10), Indian

School Certificate (representing completion of Class 12), and Certificate in Vocational Education (representing completion of Class 12 in the vocational stream). CISCE programs and examinations are conducted in English. Students have to be enrolled in an affiliated school to take the CISCE examinations. Those who have failed in the examination may reappear at a subsequent examination as a "candidate not in attendance".

– **National Institute of Open Schooling (NIOS)**. First established in 1989 as the National Open School to cater to out-of-school children, it offers elementary, secondary and higher secondary as well as vocational education, with a total enrolment of over 1.4 million. It administers public examinations leading to Secondary Course Certificate (Class 10) and Senior Secondary Certificate (Class 12).

CBSE and CISCE certificates are generally considered to be of higher standards than those issued by the state boards. The NIOS examinations have been recognized by the majority of state boards and universities, a list of which can be found on the NIOS website.

Curriculum

For many years after Independence, school education developed at the state level. Since the 1970s the central government has been promoting a national curriculum based on the 10+2 structure. In 1973 the Ministry of Education appointed an expert group to develop a national curriculum for the 10+2 system. This was ultimately completed by the National Council of Educational Research and Training (NCERT) and adopted by the Central Board of Secondary Education (CBSE) for the 1975-76 school year.

The National Policy on Education of 1986 and the Plan of Action of 1992 assigned to NCERT the role of designing, promoting, and periodically reviewing a National Curriculum Framework for School Education. NCERT also publishes textbooks based on the National Curriculum Framework, and CBSE prescribes the NCERT textbooks for taking its Class 10 and Class 12 examinations. While the National Curriculum Framework of 2000 remains in effect for many schools, textbooks based on the National Curriculum Framework of 2005 will be introduced between 2006 and 2008. All the states have accepted the National Curriculum Framework in principle, though its implementation remains uneven. The state boards usually prescribe subjects and syllabi for schools under their jurisdiction.

School Year

The school year has 200 work days, including a minimum of 180 days for instruction as prescribed in the National Curriculum Framework. It usually begins in June/July and ends in March/April, followed by a summer vacation, though in mountainous areas the long vacation falls in winter. At the primary stage, each school day lasts five hours, including four hours of instruction. At the upper primary, secondary and higher secondary stages, a school day lasts six hours, including five hours of instruction. Each class session lasts about 40 minutes.

Grading Scale

The percentage system is predominantly used. Marking is low, and pass marks generally

range between 30 and 35 percent. The most common grading scale at the higher secondary level is as follows:

Table 6. School Education Grading Scale

Mark (%)	Descriptor
60-100	First Class
50-59	Second Class
35-49	Pass Class

The Central Board of Secondary Education (CBSE) puts all the candidates who passed the Class 10 or Class 12 examination in a ranking order to award the grades. The top 0.1% of candidates will receive Merit Certificates. The pass mark is 33%.

Table 7. CBSE Grading Scale[9]

Grade	Description
A1	Top 1/8 of passed candidates
A2	Next 1/8 of passed candidates
B1	Next 1/8 of passed candidates
B2	Next 1/8 of passed candidates
C1	Next 1/8 of passed candidates
C2	Next 1/8 of passed candidates
D1	Next 1/8 of passed candidates
D2	Next 1/8 of passed candidates
E	Fail

Administration

The Department of School Education and Literacy within the Ministry of Human Resource Development of the central government and the state ministries/departments of education are responsible for administering school education in India. The state and local governments appoint inspectors that ensure schools maintain proper standards and facilities. The schools are managed by government and private sectors. Many of the privately run schools are also called public schools and receive funds from the government for most of their operating expenditure.

Preschool Education

Preschool education, often called pre-primary education, is optional for entry into public schools but is compulsory for many of the private schools. Usually 2 years in length, it caters to children aged 4-6 and prepares them for entry into primary schools. It is available in various forms such as Early Child Care and Education (ECCE) centres, preparatory schools, and nursery and kindergarten classes. Learning consists of games and group activities to promote environmental awareness and social skills. Preschool education helps achieve gender parity in elementary education by freeing girls from sibling care. It is concentrated in urban areas and enrols less than 10 percent of children in the target age group. Preschool teachers generally complete a one-year teacher training program beyond Class 10.

Elementary Education

Elementary education for children aged 6-14 is free and compulsory. In all the states and union territories, elementary education consists of two cycles: primary school (also called lower primary school) and upper primary school (also called middle school, especially in rural areas). It lasts 8 years in most states and union territories, consisting of 5 years of primary school plus 3 years of upper primary school (5+3), though several states adopt the 4+4 pattern. In a few states, elementary education is seven years in length, with 4+3 as the dominant pattern. Elementary school teachers generally complete a two-year program beyond Class 12. Some teachers hold a one-year Bachelor of Education degree (with entry based on completion of a first bachelor degree) or a four-year Bachelor of Elementary Education degree.

The elementary school curriculum covers basic subjects like languages, math, science, and environmental studies. Instruction is in Hindi or a regional language, with a second language such as English or Hindi introduced in the upper primary stage. The following tables show the subjects and time allocations for elementary education recommended in 1977 by the Ishwarbhai Patel Committee, which was appointed by the Ministry of Education and Social Welfare to review the NCERT national curriculum.[10]

Table 8. Elementary (Classes 1-4/5) Subjects, 1977

Subject	Time Allocation
One language	20%
Math	20%
Environmental studies (social studies, nature study and health education)	20%
Socially useful productive work (SUPW)	20%
Games and creative activities such as music, dancing and painting	20%

Table 9. Elementary (Classes 5/6-7/8) Subjects, 1977

Subject	Hours (per week)
Languages	7
Math	4
History, civics, and geography	4
General science	4
The arts (music, dancing, and painting)	3
Socially useful productive work (SUPW) and community service	6
Games, physical education, and supervised study	4
Total	32

The following table lists the subjects for elementary education as prescribed in the National Curriculum Framework of 2000:

Table 10. Elementary (Classes 1-8) Subjects, National Curriculum Framework, 2000[11]

Stage		Subject
Primary	Classes 1-2	One language – mother tongue/regional language
		Math
		Art of living and productive living

	Classes 3-5	One language – mother tongue/regional language
		Math
		Environmental studies
		Art of living and productive living
Upper Primary	Classes 6-8	Three languages – mother tongue/regional language, modern Indian language, and English
		Math
		Science and technology
		Social sciences
		Work education
		Art education
		Health and physical education

Upon completion of elementary education, students take an examination administered by the school or the state board, variously known as the higher primary examination, middle school examination, Class 8 examination, etc.

Secondary Education

Secondary education (also called lower secondary or high school) is not compulsory. It lasts two years from Class 9 to Class 10 in most states. The curriculum includes subjects such as languages, math, science, and the arts. Secondary school teachers generally hold a one-year Bachelor of Education in Secondary Education (with entry based on the completion of a first bachelor degree).

The following table shows the subjects and time allocations for secondary education as recommended by the Ishwarbhai Patel Committee in 1977.[12] The committee indicated that the scheme was illustrative only, leaving it to the state boards to decide whether to make some subjects compulsory and others elective.

Table 11. Secondary (Classes 8/9-10) Subjects, 1977

Subjects	Hours (per week)
Languages	8
Math	4
Science	5
History, civics, and geography (as one course)	3
One of the following: the arts (music, dancing, painting, etc.), home science, agriculture, commerce, economics, social reconstruction, classical languages, etc.	2
Socially useful productive work (SUPW) and community service	6
Games, physical education, and supervised study	4
Total	32

The 2000 National Curriculum Framework lists the following subjects for secondary education:

Table 12. Secondary (Classes 9-10) Subjects, National Curriculum Framework, 2000

Stage	Subject
Secondary	Three languages – mother tongue/regional language, modern Indian

	language, and English
	Math
	Science and technology
	Social sciences
	Work education
	Art education
	Health and physical education

While following the National Curriculum Framework in terms of educational structure and general course patterns, the state boards prescribe specific subjects and syllabi for schools under their jurisdiction and for their secondary certificate examinations. The following table lists the subjects and time allocation for secondary education in the state of Tamil Nadu.

Table 13. Secondary (Classes 9-10) Subjects, Tamil Nadu[13]

Stage	Subject	Hours (per week)
Secondary	English	6
	Tamil/regional language	7
	Math	7
	Science and technology	7
	Social sciences	6
	Scientific Tamil	2
	Computer education	2
	Life oriented education	1
	Health and physical education	2
	Total	40

Certificates of Secondary Education

Upon completion of secondary education, students receive a certificate by passing an external examination given by either the state board or one of the three All-India boards. With the certificate, they may seek employment or admission into higher secondary school. They may also pursue vocational and technical education, such as trade programs of various lengths offered by industrial training institutes (ITIs) and three-year diploma programs offered by polytechnics. The names of the secondary education certificates vary across the states and over time, and some older certificates represent the completion of 11 years of schooling. The table below gives some of the certificate names.

Table 14. Examples of Names of Secondary Education Certificates

Examining Body	Certificate
CBSE	All India Secondary School Certificate
	Delhi Secondary School Certificate
	Matriculation Examination
CISCE	Indian Certificate of Secondary Education
NIOS	Secondary School Certificate
State Boards	Secondary School Certificate
	Secondary School Leaving Certificate
	Secondary School Examination
	Matriculation Examination
	Anglo-Indian High School Examination Certificate

Higher Secondary Education

Higher secondary (also called senior secondary) education lasts two years from Class 11 to Class 12. It is divided into the academic or general stream, which prepares students for higher education, and the vocational stream, which prepares students for employment and may lead to further education in vocational and technical fields. More than 90 percent of students choose the academic stream. Higher secondary education is provided mostly by schools and also by some colleges. Higher secondary school teachers generally hold a one-year Bachelor of Education degree in Secondary Education (with entry based on the completion of a first bachelor degree), plus a master's degree (Master of Arts, Master of Commerce, Master of Science, or Master of Education).
which is often divided into subject groups such as science, arts, and commerce
The National Review Committee on Higher Secondary Education of 1978 recommends the following course pattern for both the academic and vocational streams:

Table 15. Higher Secondary (Classes 11-12) Subjects, 1978[14]

Subject	Time Allocation
Languages	15%
Socially useful productive work (SUPW)	15%
Electives	70%

The 2000 National Curriculum Framework prescribes the following courses for higher secondary education. In the academic stream, foundation and elective courses take up about 40% and 60% of instructional time respectively. In the vocational stream, language, general foundation courses and health and physical education take up about 30% of instructional time, with the remaining 70% devoted to vocational electives.

Table 16. Higher Secondary (Classes 11-12) Subjects, National Curriculum Framework, 2000

Stream	Subject	
Academic	Foundation Courses (compulsory)	Language and literature
		Work education
		Health and physical education, games, and sports
	Electives	Choose three of the subjects provided by the relevant state or All-India boards: Modern Indian languages and their literature, Sanskrit and its literature, classical languages and their literature, English (academic and specialised), other foreign languages, physics, chemistry, biology, mathematics, computer science, geology, political science, geography, economics, history, sociology, psychology, philosophy, fine arts, sculpture, instrumental music, vocal music, home science, accountancy, business studies, engineering drawing, etc.
Vocational	Language (compulsory)	
	General Foundation Courses	General studies, entrepreneurship development, environmental education, rural development, and information and communication technology
	Health and Physical Education (compulsory)	
	Vocational Electives	Choose from a large number of subjects based on local needs, employment opportunities, students' interest, and the geographical location of the school. A number of courses for developing specific competencies may be chosen for each broad area of study such as agriculture, engineering and technology, business and commerce, home

		science, health and paramedical services, and humanities.

While following the National Curriculum Framework in terms of educational structure and general course patterns, the state boards prescribe specific subjects and syllabi for schools under their jurisdiction and for their higher secondary certificate examinations. Whereas the National Curriculum Framework allows students to choose any three subjects from the electives, some boards restrict the combinations in the form of streams or subject groups, for example humanities stream/group, science stream/group, and commerce stream/group.

The following tables give examples of higher secondary subjects of three states, Andhra Pradesh, Madhya Pradesh, and Tamil Nadu. The information is obtained from the official websites of educational authorities of these states; please refer to the websites for further details.

Table 17. Higher Secondary (Intermediate) Subjects, Andhra Pradesh[15]

Group	Subject
English	
Second Languages	Telugu, Hindi, Sanskrit, Urdu, Arabic, French, Tamil, Kannada, Oriya and Marathi
Optional Subjects	Mathematics, physics, chemistry, botany, zoology, commerce, economics, civics, history, psychology, public administration, logic, sociology, geography and geology
Modern Language Subjects	English, Telugu, Hindi and Urdu

Table 18. Higher Secondary Subjects, Madhya Pradesh[16]

Group	Subject	
Group A – Language	First language	
	Second language	
Group B – Diversified Subjects	General education courses	Humanities group: history, geography, political science, languages, etc.
		Science group: physics, chemistry, biology, higher math, agriculture, etc.
		Commerce group: elements of commerce & management, bookkeeping & accountancy, computer application, business math, etc.
		Agriculture group: elements of science & math useful for agriculture, crop production & horticulture, etc.
		Fine arts group: drawing and painting, still life and paint making, history of Indian art and world art, etc.
		Home science group: home management & nutrition, mother-craft, health & hygiene, elements of science, etc.
	Vocational courses	
Group C	Socially useful productive work (SUPW) or vocational training of a trade	
	Physical education or National Cadet Cores/National Social Service/ Boy Scout & Girl Guide or co-curricular & other activities	

Table 19. Higher Secondary Subjects, Tamil Nadu[17]

Group	Subject
Part I – Language	Tamil, Hindi, Kannada, Telugu, Malayalam, Urdu, Gujarati, Sanskrit, Arabic, Persian, French, German, and Latin
Part II – English	
Part III – Optional Subjects	Math, physics, chemistry, biology-zoology, biology-botany,

(Students choose a combination of four subjects for the higher secondary examination.)	history, geography, accountancy, commerce, economics, etc.

Certificates of Higher Secondary Education

Upon completion of higher secondary education, students take an external examination administered by either the state board or one of the All-India boards. The higher secondary education certificates may lead to employment and admission into university programs. The names of the higher secondary education certificates vary across the states and over time, and some older certificates issued before the implementation of the 10+2 structure may represent 11 years of schooling.

Table 20. Examples of Names of Higher Secondary Education Certificates

Examining Body	Certificate
CBSE	All India Senior School Certificate
	Delhi Senior School Certificate
	(All India) Higher Secondary Examination Part II
CISCE	Indian School Certificate
NIOS	Senior Secondary Certificate
State Boards	Higher Secondary (School) Certificate
	Intermediate Examination
	Pre-University Examination
	Pre-Degree Examination

Higher Education

Overview

Institutions of higher learning based in Buddhist monasteries appeared in India more than two thousand years ago. The curriculum was not restricted to Buddhist teaching but covered a wide range of subjects such as philosophy, grammar, arts, astronomy, astrology, mathematics and medicine. Modern higher education in India was rooted in the British system, with the first universities established in the mid to late 19th century as affiliating and examining bodies modelled after the University of London in the 1850s. Since the country gained independence in 1947, higher education has enjoyed phenomenal growth and expansion. Today India has one of the world's largest higher education sectors, with 338 universities and 16,885 colleges enrolling a total of 9.95 million students.[18]

Administration
The central and state governments share responsibilities for higher education. The Department of Higher Education within the Ministry of Human Resource Development directs higher education at the national level. Apart from administering central universities, institutions of national importance, and other centrally funded institutions, the central government is also charged with maintaining quality of higher education and promoting research. The President of the central government acts as the "Visitor" of all central universities, with the right and duty of supervision over those institutions. The department/council of higher education or relevant educational branch of the state government is responsible for state universities within its jurisdiction. With a few exceptions, the Governor of a state is the Chancellor of the state universities.

Funding
Higher education in India is largely public funded, with the states contributing about 80 percent of the expenditure. Central universities receive funds from the University Grants Commission (UGC) in the form of both development grant and maintenance grant. Institutions of national importance receive funds directly from the Ministry of Human Resource Development. State universities are mainly funded by the state governments, though about half of them also receive development grant from the UGC. Universities also collect fees from students and may receive other forms of financial support.

National Bodies
A number of statutory and apex bodies assist in the coordination of higher education at the national level.

- **Central Advisory Board of Education (CABE).** Established in 1920, it acts as the central government's main advisory body for education and plays a leading role in the development and monitoring of policies and programs. It consists of representatives from the central and state governments, the Parliament and universities as well as prominent educators.
- **Association of Indian Universities (AIU).** First established in 1925 as the Inter-University Board of India and Ceylon, it adopted its present name in 1973. All

universities, deemed universities and institutions of national importance are its members. As an autonomous and voluntary inter-university organization, it brings together university administrators and academics from across India to exchange views and discuss educational issues. Its objectives include coordinating the work of universities, establishing equivalence of degrees between Indian and foreign universities, and helping universities obtain recognition for degrees, diplomas and examinations within India. The AIU also provides key information about Indian universities and their programs through its publications such as the biannual *Universities Handbook*.

- **University Grants Commission (UGC)**. Established in 1945 as the University Grants Committee, the UGC became a statutory body of the central government in 1956. It has the dual responsibilities of allocating grants to universities for their maintenance and development and coordinating and maintaining standards of teaching and research in higher education. It advises the central and state governments on measures for the improvement of university education and serves as a vital link between governments and higher education institutions. Its website provides updated lists of universities and colleges. With its head office in New Delhi, UGC has decentralised its operations by setting up six regional centres at Pune, Hyderabad, Kolkata, Bhopal, Guwahati and Bangalore.
- **All India Council for Technical Education (AICTE).** Established in 1945 and granted statutory status in 1987, it is responsible for planning, development and maintaining standards in technical education at all levels, from diploma to postgraduate studies. Its purview covers programs in technical fields such as architecture, engineering, technology, management, and pharmacy.
- **Professional and research bodies**. Several professional bodies are responsible for regulating academic standards and enforcing professional code of ethics for their respective professions. These include the Indian Medical Council, The Dental Council of India, the Pharmacy Council of India, the Nursing Council of India, and the Bar Council of India. A few national research bodies have been established to promote advanced research in various disciplines. Prominent among them are the Indian Council of Social Science Research, Council of Scientific and Industrial Research, Indian Council of Medical Research, and Indian Council of Agricultural Research. They provide funds to institutions both in and outside the university system and maintain a number of research laboratories, some of which are recognized as centres for doctoral work.

Recognition, Quality Assurance and Accreditation

According to the UGC Act 1956, academic degrees can only be conferred by a university established by a central Act or a state Act, or an institution deemed to be university, or an institution specially empowered by an Act of Parliament to confer or grant degrees. The UGC provides lists of universities, university-level institutions, and colleges on its website. It also maintains a list of fake universities/institutions and issues press releases at the beginning of each academic session warning students against such institutions. The *Universities Handbook* published by the Association of Indian Universities (AIU) contains detailed information on universities and their affiliated or constituent colleges.

The rapid expansion of the higher education system has raised concerns about quality, as some institutions are perceived to have substandard faculty and teaching facilities. The central and state governments are assisted by a number of national bodies in maintaining quality and standards in higher education. The UGC advises the governments on the establishment of institutions and the granting of deemed university status. The All India Council for Technical Education (AICTE) is responsible for approving technical institutions. To promote quality in university and technical education, the UGC and AICTE have established two separate accreditation bodies, the National Assessment and Accreditation Council and the National Board of Accreditation.

The National Assessment and Accreditation Council (NAAC), headquartered in Bangalore, was established as an autonomous body by the UGC in 1994. Its main function is to periodically assess and accredit institutions of higher learning, including universities and colleges, and of specific academic programs. Accreditation by the NAAC is voluntary and is valid for five years. Institutions are scored out of 100 on a number of criteria such as curriculum, teaching, research, infrastructure, and student service. Institutions or programs that score 55% or more receive the "accredited" status and a grade ranging from C to A^{++}. A total of 130 universities and 2,955 colleges have been granted NAAC accreditation by early 2007.

The National Board of Accreditation (NBA) was established as an autonomous body by the AICTE in 1987. Its main function is to periodically assess and accredit diploma and degree programs in engineering and technology, management, pharmacy, architecture, and other professional and technical disciplines that fall under the purview of AICTE. NBA grants accreditation not to institutions but at the program level. Accreditation by NBA is voluntary and is valid for five or six years. Programs are scored out of 1000 on a number of criteria such as academic performance, resources and facilities, and industry interaction. Programs that score 650 or more receive accreditation for five or six years. While AICTE approval ensures minimum standards have been met, NBA accreditation indicates high quality among peers. The NBA website contains a list of over 1,000 accredited programs.

Program Structure

Modern higher education in India is modeled after the British system. It follows the three-tier degree structure (bachelor, master and Ph.D.). In addition, there are certificate and diploma programs at both the undergraduate and graduate levels.

From independence in 1947 to the early 1970s, undergraduate education in most states represented a total of 14 years of schooling. Until 1960, a bachelor's degree usually involved two years of fulltime study following 10 years of schooling and two years of intermediate study. From then on to the early 1970s, most states adopted the 10+1+3 system, with 11 years of schooling (10 years of school education plus one year of higher secondary or pre-university study) followed by a three-year bachelor's degree.

The current 10+2+3 system, with 12 years of school education followed by a three-year bachelor's degree, evolved in the 1970s and was implemented across the country, with

some exceptions, in the late 1980s. One such exception was the two-year pass bachelor's degree offered in the state of West Bengal until 2000.

Typical higher education programs include:

- General bachelor's degrees (arts, science and commerce) involve three years of fulltime study. They are usually offered as pass or general degrees, though some universities offer honours or special bachelor degrees, which have more academic depth and tend to attract high performing students.

- Bachelor's degrees in professional fields such as agriculture, engineering, technology, pharmacy, and medicine take between four and five and a half years to complete. Bachelor's degree in law can be taken as a five-year integrated degree or a three-year degree with entry based on a first bachelor's degree.

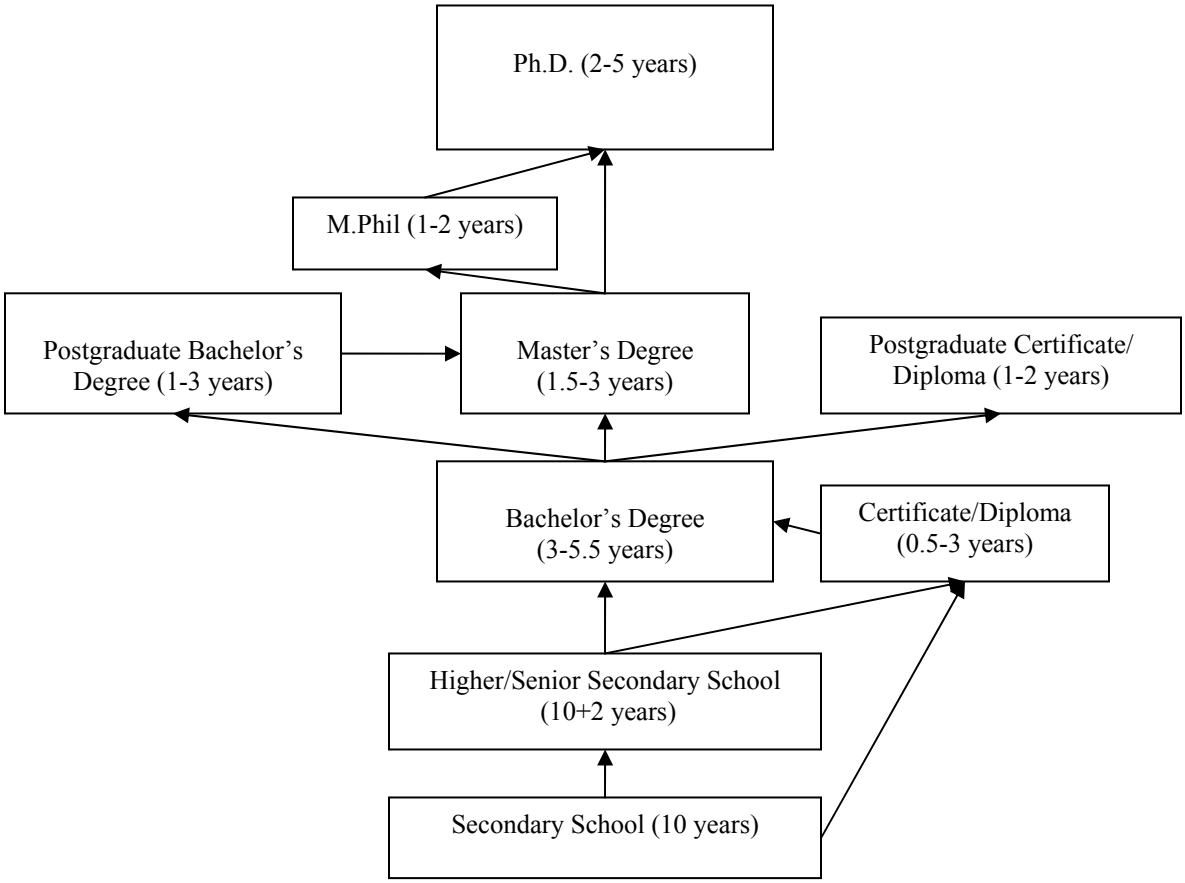
- Master's degree programs normally last two years and can be either research or coursework based.

- The Master of Philosophy (M.Phil), lasting one to two years, is taken after completion of a master's degree, often as a preparatory program for doctoral studies.

- The length of the Ph.D. programs varies but is normally at least two years after an M.Phil or three or more years after a master's degree.

- Various certificates and diplomas programs lasting six months to three years at both the undergraduate and postgraduate levels are also available. Entry requirements range from secondary school certificate examination (Class 10) to a bachelor's degree. One such program is postgraduate diplomas, which usually require one year of fulltime study or two years of part-time study following the completion of a bachelor's or master's degree.

Figure 4. Outline of Higher Education System



Academic Year

The academic year usually begins in June/July and ends in March/April, followed by a long summer vacation. For a small number of institutions in mountainous areas, the academic year begins in March and ends in December, with a long vacation in winter. Each academic year has approximately 185 actual teaching days and is divided either into two semesters or three terms. Most universities hold examinations annually at the end of the school year.

Table 21. Academic Calendar, University of Delhi[19]

Period	Time
First Term	July 16 – Sep 30
Autumn Vacation	Oct 1 – Oct 15
Second Term	Oct 16 – Dec 23
Winter Vacation	Dec 24 – Jan 7
Third Term	Jan 8 – Mar 24
University Examinations	April and May
Summer Vacation	May 1 – July 15

Some institutions have adopted the credit system, with one credit representing one instructional hour per week, or two or three laboratory hours per week. Some programs

include a few non-credit courses. Institutions that use the credit system usually prescribe minimum credit requirements students must meet in order to qualify for a degree or to continue their study.

Medium of Instruction

Historically, English was the language of instruction in Indian universities. Today both English and Hindi/regional languages are used. In science, professional, and graduate courses, English remains the predominant medium of instruction.

Grading Scale

Most bachelor's and master's degrees are classified into divisions or classes based on the marks students obtain in the major examinations at the end of each year or semester. Grading scale may vary from institution to institution. Marking is low, with pass marks generally ranging between 33 and 40%, though some institutions/programs adopt a 50% pass. Students who have failed in one or more subjects in a major examination but who have achieved institution-designated minimum marks (e.g. 25%) in the aggregate may be allowed to proceed with their study and make up the failed subjects at a subsequent examination.

Table 22. Grading Scale for B.Com (Pass), University of Delhi[20]

Division	Percentage
First Division	60% or above
Second Division	50% or above
Third Division	36% or above

Table 23. Grading Scale for B.Sc. Nursing, Maharashtra University of Health Sciences, Nashik[21]

Class	Percentage
First Class with Distinction	70% or above
First Class	60% or above
Second Class	50% or above
Fail	Below 50%

A number of institutions such as the Indian Institutes of Technology (IITs), the central and state agricultural universities, and Jawaharlal Nehru University adopt a 10-point system. The grading scale may vary from institution to institution. The points can be converted to letter grades and are sometimes divided into divisions or classes.

Table 24. Grading Scale, Indian Institute of Technology, Delhi[22]

Grade Point	Letter Grade	Descriptor
10	A	Outstanding
9	A-	Excellent
8	B	Very Good
7	B-	Good
6	C	Average
5	C-	Below Average
4	D	Marginal
2	E	Poor
0	F	Very Poor

Table 25. Grading Scale, Jawaharlal Nehru University[23]

Letter Grade	Grade Point
A+	9
A	8
A-	7
B+	6
B	5
B-	4
C+	3
C	2
C-	1
F	Fail

Types of Institutions

There are four major types of universities and other university-level institutions authorized to award academic degrees in India:

- Universities
- Deemed Universities
- Institutions of National Importance
- Research Institutions outside the University System

Universities

Universities in India were created by Acts of Parliament or state legislatures. **Central universities** are established by Acts of Parliament and funded by the central government, mainly through the University Grants Commission. There are 18 central universities, including the Indira Gandhi National Open University. **State universities** are established by Acts of state legislatures. They are funded by the state governments, and about half of them also receive development grants from the UGC.

Table 26. Central Universities[24]

University	State
University of Hyderabad, Hyderabad	Andhra Pradesh
Maulana Azad National Urdu University, Hyderabad	Andhra Pradesh
Assam University, Silchar	Assam
Tezpur University, Tezpur	Assam
University of Delhi, Delhi	Delhi
Indira Gandhi National Open University, New Delhi	Delhi
Jamia Millia Islamia, New Delhi	Delhi
Jawaharlal Nehru University, New Delhi	Delhi
Mahatma Gandhi Antarrashtriya Hindi Vishwavidyalaya, Chitrakoot	Maharashtra
Central Agricultural University, Imphal	Manipur
Manipur University, Canchipur Imphal	Manipur
North Eastern Hill University, Shilong	Meghalaya
Mizoram University, Aizwal	Mizoram
Nagaland University, Lumami, Kohima	Nagaland
Pondicherry University, Pondicherry	Pondicherry
Aligarh Muslim University, Aligarh	Uttar Pradesh
University of Allahabad, Senate Hall Allahabad	Uttar Pradesh
Babasaheb Bhimrao Ambedkar University	Uttar Pradesh

Banaras Hindu University, Varanasi	Uttar Pradesh
Visva Bharati, Santiniketan	West Bengal

Universities may be classified in various other ways. In terms of structure, the majority of them are affiliating universities; the rest are unitary universities. An **affiliating university** has up to two hundred colleges attached to it. It formulates the curricula and syllabi, administers examinations, and awards degrees for undergraduate programs at its affiliated colleges. Its own departments conduct research and offer graduate programs. There are about 115 affiliating universities in India. A **unitary university** has no affiliated college attached to it. Its departments (and in some cases constituent colleges) conduct research and offer both undergraduate and graduate programs. Some unitary universities only provide teaching at the graduate level.

Fourteen **open universities**, including the Indira Gandhi National Open University (IGNOU) and 13 state universities, offer certificate, diploma, and degree (bachelor, master, and Ph.D.) programs. They are flexible in terms of admission rules and modes and duration of study, and have a special focus on learners from socially and economically disadvantaged groups. In addition, many traditional universities have established distance learning schools or institutes. The IGNOU also serves as a national apex body for distance education. The Distance Education Council (DEC) has been established as a statutory body under the IGNOU, responsible for the promotion and coordination of the open university and distance education system, and for the determination of its standards.

In terms of fields of study, universities may be comprehensive or specialized. There are 39 **agricultural universities**, with at least one in each state. There are also institutions specializing in engineering and technology, health sciences, law, etc.

Colleges

Like universities, colleges in India can also be classified in various ways. A major distinction is that between **affiliated colleges** and **university colleges**. There are only a small number of university colleges (also called constituent colleges), which are directly administered by the university and usually located on the university campus. The majority of colleges are affiliated to universities. The affiliating university sets the syllabi, conducts major examinations, and awards degrees, while teaching is undertaken at the affiliated colleges. Most colleges only teach at the undergraduate level, and some only offer pass bachelor programs, though a number of colleges offer master's and Ph.D. courses. The power of granting affiliation to a college vests with the university in consultation with the government.

A small number of affiliated colleges have become **autonomous colleges**. College autonomy, first introduced in 1973, aims to promote the decentralization of academic administration, innovation and higher standards. Autonomy give colleges more say in course design, pedagogy, examinations, and admissions, and autonomous colleges generally enjoy high prestige. The name of the autonomous college is mentioned on the degrees certificates, which continue to be issued by the parent university. The autonomous college may also issue marks sheets for the first two years of a three-year

bachelor's degree program. The UGC website provides a list of 234 autonomous colleges.

Among the affiliated colleges, about 15 to 20 percent are **government colleges**. They are managed by state governments, and their teachers and staff are government employees. The majority of affiliated colleges are **privately managed colleges**, which generally receive considerable funds from the state governments.

Most colleges offer courses in arts, science and commerce. There are also a number of **professional colleges** that specialize in medicine, engineering and technology, law, and management. Admission into a professional college is usually much more competitive than into a general college.

Deemed Universities

The status of "deemed-to-be-university" or "deemed university" is conferred on an institution by the central government on the recommendation of the UGC, whose website provides a list of 105 deemed universities approved by early 2007. These institutions, usually called "institutes", were established outside the university system or started out as a specialized college within a university. They tend to remain specialized institutes rather than develop into comprehensive universities. For example, a number of Regional Engineering Colleges have been renamed National Institutes of Technology and granted deemed university status. A deemed university cannot have affiliated colleges. Deemed universities enjoy all the privileges and status of regular universities, and some have international reputations. Examples include Tata Institute of Social Sciences, Bombay; Indian Institute of Science, Bangalore; and Indian Agricultural Research Institute, New Delhi.

Institutions of National Importance

A total of 13 "institutions of national importance", including seven Indian Institutes of Technology (IITs), have been established or designated by Acts of Parliament. They are empowered to award academic degrees and receive ample funds directly from the Ministry of Human Resource Development. They have an international reputation for providing high quality undergraduate and graduate programs, mainly in engineering and technology.

Table 27. Institutions of National Importance[25]

Institution	State
Indian Institute of Technology, Guwahati	Assam
Postgraduate Institute of Medical Education and Research, Chandigarh	Chandigarh
All India Institute of Medical Sciences, New Delhi	Delhi
Indian Institute of Technology, Delhi	Delhi
Sree Chitra Tirunal Institute for Medical Sciences and Technology, Thirunvananthapuram	Kerala
Indian Institute of Technology, Bombay (Mumbai)	Maharashtra
National Institute of Pharmaceutical Education and Research, Mohali	Punjab
Dakshina Bharti Hindi Prachar Sabha, Chennai	Tamil Nadu
Indian Institute of Technology, Madras (Chennai)	Tamil Nadu
Indian Institute of Technology, Kanpur	Uttar Pradesh
Indian Institute of Technology, Roorkee	Uttaranchal

Indian Institute of Technology, Kharagpur	West Bengal
Indian Statistical Institute, Kolkata	West Bengal

It should be noted that the six Indian Institutes of Management (IIMs) at Ahmedabad, Bangalore, Indore, Kolkata, Kozhikode and Lucknow do not have the power to award degrees, nor are they designated as "institutions of national importance". However, they have a reputation for providing world class management education, and their credentials are treated on par with university degrees.

Research Institutions outside the University System

A number of research institutions operate outside the university system and make significant contributions to advanced research in various disciplines. The Indian Council of Social Science Research, established in 1969 to finance and promote research in social sciences, sponsors over 20 such research institutions, including:

- Indian Institute of Public Administration, New Delhi
- National Institute of Design, Ahmedabad
- Centre for the Study of Developing Societies, Delhi
- Centre for Policy Research, New Delhi
- Indian Institute of Education, Poona
- Centre for Development, Trivandrum

The Council of Scientific and Industrial Research, established in 1942 to promote scientific and industrial research, runs over 40 national laboratories and institutes, most of which are recognized by universities as centres of doctoral work. Research laboratories are also maintained by various other government ministries and departments, such as Ministry of Agriculture, Ministry of Health, Ministry of Industry, and Department of Science and Technology.

Admissions

Undergraduate Admission

Admission to certificate and diploma courses, available mostly in vocational and specialized fields, is based on the completion of either secondary school (Class 10) or higher secondary school (Class 12). Some programs raised their entry requirements from Class 10 to Class 12 in recent years, and there are also programs that have Class 10 as their minimum admission requirement, but many of their applicants have nevertheless completed Class 12.

Admission to bachelor's degree programs is based on the completion of higher secondary school, which generally represents 12 years of schooling after the 1980s. Applicants must pass the higher secondary education certificate examination administered by the state board or one of the three All-India boards. Please refer to the previous chapter for examples of names of higher secondary certificates issued by the various boards. Universities may prescribe minimum marks (e.g. 40% in the aggregate on the Indian scale) and required subjects or subject groups for entry into their programs. Applicants

without 12 years of formal schooling may seek admission into bachelor's degree programs at open universities.

Some institutions offer five-year integrated bachelor's degrees in certain specialized fields such as home science and fine arts, with entry based on the completion of Class 10.

Entry into professional colleges in engineering and technology, medicine, dentistry, pharmacy, management, architecture, etc. is competitive. Applicants must have completed higher secondary school with relevant subjects and are usually required to sit an entrance examination.

Applicants whose higher secondary education did not follow the structure and content of the 10+2 system are required to complete a one-year pre-professional course to receive the pre-professional certificate (e.g. in medicine or engineering) before being admitted to the professional degree program.

Entrance examinations for professional degree programs are administered by universities, state educational authorities, and the Central Board of Secondary Education (CBSE). Following are some examples:

- **Joint Entrance Examination (JEE).** This highly competitive examination is conducted by the Indian Institutes of Technology (IITs), Institute of Technology, Banaras Hindu University (BHU), Varanasi and Indian School of Mines, Dhanbad, for admission into their undergraduate courses. In 2007, a quarter of a million students across the country sat the examination, competing for 5,500 seats.
- **All-India Pre-Medical/Pre-Dental Entrance Examination (AIPMT).** It is conducted by CBSE for admission into Bachelor of Medicine/Bachelor of Surgery (MBBS) or Bachelor of Dental Surgery (BDS) courses at central and state medical and dental colleges except in the states of Andhra Pradesh and Jammu & Kashmir. The All-India Institute of Medical Sciences (AIIMS) conducts its own examination for MBBS admission throughout India.
- **All-India Engineering/Architecture Entrance Examination (AIEEE).** It is conducted by CBSE for degree courses in engineering and architecture at National Institutes of Technology, Indian Institutes of Information Technology, deemed universities and central or state institutions other than those covered by Joint Entrance Examination (JEE) or state-level entrance examinations.

Government regulations provide for the reservation of places for candidates from disadvantaged groups. For example, the *Central Educational Institutions (Reservation in Admission) Act, 2006* stipulates that all central institutions, including central universities, institutions of national importance and deemed universities, reserve 15 percent of space in each branch of study or faculty for the Scheduled Castes, 7.5 percent for the Scheduled Tribes, and 27 percent for other backward classes. This applies to both undergraduate and graduate programs. For programs with a minimum mark requirement, it is usually a few percentage points lower for members of the Scheduled Castes and Tribes. For example, to sit the MBBS entrance examination for the prestigious AIIMS, applicants must achieve at least 60% (or 50% in the case of Scheduled Castes/Tribes) in aggregate in physics,

chemistry, biology, and English in the higher secondary certificate examination.

Graduate Admission

Admission into master's programs generally requires a bachelor's degree in a related discipline with a Second Division Pass and a mark of at least 50% on the Indian scale. Some selective institutions may require a higher minimum mark (e.g. 60%) or a bachelor's degree in the First Division. Entry into some professional programs is highly competitive; applicants must write a separate entrance examination in addition to meeting all the other requirements. Following are some examples of graduate entrance examinations.

Since 1988 the All India Management Association (AIMA) has been conducting a **Management Aptitude Test (MAT)** on a national basis every year in the months of May, September and December. MAT functions as a national entrance test for admission to Master of Business Administration (MBA) and equivalent programs such as Postgraduate Diploma in Management (PGDM) and Postgraduate Diploma in Information Technology and Management (PGDITM).

The **Graduate Aptitude Test in Engineering (GATE)** is an All-India examination conducted by the Indian Institute of Science, Bangalore and the seven IITs. Many universities and colleges adopt GATE as the national admission test for their graduate programs in engineering, technology, architecture, and pharmacy, such as Master of Engineering (ME) and Master of Technology (M.Tech). The Ministry of Human Resource Development also uses the examination to allocate scholarship/assistantship for ME and M.Tech students.

Since 2004 a **Joint Admission Test to MSc (JAM)** has been conducted by IITs for applicants to their Master of Science (M.Sc.) and M.Sc.-Ph.D. dual degree programs.

Programs and Credentials: General Education

In awarding degrees, universities must adhere to the standard nomenclature as approved by the University Grants Commission (UGC). The UGC website provides a list (updated in 2003) of 142 approved bachelor, master, and doctoral degrees. Certificate and diploma courses are also available at both undergraduate and graduate levels. Since a first degree holder is called a "graduate" in India, "graduate education" in Indian terminology refers to undergraduate education, and "postgraduate education" is used to refer to graduate education.

Certificates and Diplomas

Undergraduate certificate and diploma courses, sometimes called "graduate certificates/diplomas" in Indian terminology, are available in a wide range of specialized or vocational fields such as engineering and technology, teacher education, nursing, pharmacy, foreign languages, fine arts, business, and hotel management. The length of the programs varies from six months to three years. Entry is normally based on the

completion of either secondary school (Class 10) or higher secondary school (Class 12).

Certificate and diploma programs are provided by not only universities and university-affiliated colleges, but also other institutions. For example, three-year diplomas in a range of engineering and technological fields, with entry usually based on the completion of secondary school, are available at polytechnics. Certificate and diploma courses in nursing and midwifery are mostly offered at institutions attached to hospitals.

Depending on the field of study, certificate/diploma holders may be admitted into a bachelor's degree program with advanced standing. For example, an individual who holds a three-year polytechnic diploma in engineering and technology may be allowed lateral entry into the second year/third semester of a bachelor's degree program in the same field.

Bachelor's Degrees

The 10+2+3 system, first introduced in the 1970s, has been implemented in most of the country since the late 1980s. This represents 10 years of elementary and secondary education + 2 years of higher/senior secondary education + 3 years of undergraduate education (bachelor's degree).

The majority of college faculties offer bachelor's degrees in arts, science and commerce. The **Bachelors of Arts (BA), Bachelor of Science (B.Sc.) and Bachelor of Commerce (B.Com)** involve three years of fulltime study or its part-time equivalent. The courses are usually listed as "papers", for which the students must attend a number of lecture hours per week and pass the annual examinations. The BA, B.Sc. and B.Com are usually offered as pass or general degrees, though some universities offer honours or special bachelor degrees. Honours or special programs do not involve a longer duration of study but have more academic depth and tend to attract high performing students. They are either similar to the pass degree with a few additional papers, or designed as a separate course that emphasizes specialization in the chosen subject. Please refer to Appendix 3 for sample program structures for B.Com (Pass) and B.Com (Honours). A number of universities in the state of West Bengal offered two-year pass bachelor's degrees in arts, science and commerce until the 1999-2000 academic year. These two-year pass degrees do not give access to further education in master's degree programs.

Annual examinations are usually conducted by universities at the end of the academic year, between March and May. Internal assessment by the colleges accounts for a small percentage of the total marks. Students who have failed some papers in a given year but who have achieved a minimum mark designated by the university (e.g. 25% in the aggregate) may be allowed to proceed to the next year of study but must make up the failed papers in the following annual examination.

One can study for a bachelor's degree on a part-time basis or externally through distance learning programs, and sit the annual examinations as an external or private candidate. Universities usually prescribe a time limit (e.g. seven years) in which students must complete all coursework and pass the examinations to qualify for the award of the degree.

After completing a bachelor's degree, students may pursue further education in master's degree, postgraduate bachelor's degree, or postgraduate certificate or diploma programs.

In addition to the BA, B.Sc. and B.Com, several other bachelor's degrees also involve three years of fulltime study. Examples include **Bachelor of Business Administration (BBA)**, **Bachelor of Business Management (BBM)**, **Bachelor of Computer Applications (BCA)**, and **Bachelor of Physical Education (BPE)**.

Bachelor's degrees in professional fields generally involve fulltime study of four to five and a half years. Entry is based on the completion of higher secondary education with certain required subjects as designated by the program, e.g. physics, chemistry and mathematics for engineering courses. Some applicants may hold a first bachelor's degree. Program lengths may vary from institution to institution, but the general pattern is as follows:

- Four years: Bachelor of Fine Arts (BFA) (which can also be three years), Bachelor of Engineering (BE or B.Engg.), Bachelor of Technology (B.Tech.), Bachelor of Science in Engineering (B.Sc. Engg.), Bachelor of Pharmacy (B.Pharm.), Bachelor of Science in Agriculture (B.Sc. Agri.), Bachelor of Science in Horticulture (B.Sc. Hort.), Bachelor of Science in Nursing (B.Sc. Nursing), Bachelor of Nursing (B.Nurs.), Bachelor of Dental Surgery (BDS).
- Four and a half years: Bachelor of Physiotherapy (BPT).
- Five years: Bachelor of Architecture (B.Arch.), Bachelor of Veterinary Science (B.V.Sc.), Bachelor of Veterinary Science and Animal Husbandry (B.V.Sc. & A.H), Bachelor of Law (LLB or BL) integrated.
- Five and a half years: Bachelor of Medicine/Bachelor of Surgery (MBBS or BMBS).

Please refer to Programs and Credentials: Specialized and Professional Education for more information about some of the above programs.

Postgraduate Bachelor's Degrees

A few bachelor's degrees in specialized or professional fields require the completion of a previous bachelor's degree (BA, B.Sc. or BCom) for admission. Examples of one-year courses include Bachelor of Education (B.Ed), Bachelor of Library Science (BLS) or the newer Bachelor of Library and Information Science (B.Lib.I.Sc.), and Bachelor of Physical Education (B.P.Ed). A postgraduate Bachelor of Law or Bachelor of Laws (LLB) involves two or three years of fulltime study. Please refer to Programs and Credentials: Specialized and Professional Education for more information about some of the above programs.

Postgraduate Certificates and Diplomas

Postgraduate diploma programs generally require one to two years of fulltime study, with entry based on the completion of a bachelor's degree and, in some cases, a specified period of work experience. Postgraduate certificate programs have the same entry requirements but are shorter in duration, usually from six months to less than two years. Offered by universities, colleges, and other institutes, they provide advanced training in specialized fields such as management and computer technology.

While many postgraduate diplomas are for employment purposes and do not give access to further academic studies, there are quite a few exceptions, such as postgraduate diplomas in medicine approved by the Indian Medical Council, and postgraduate diplomas in management (PGDM) offered by the prestigious Indian Institutes of Management (IIMs). Please refer to Programs and Credentials: Specialized and Professional Education for more information about some of the above programs.

Master's Degrees

Master's degree in Arts, Science and Commerce (MA, M.Sc. and M.Com) involves two years of fulltime study, with entry based on the completion of a three-year bachelor's degree, usually in the same field. The area of specialization is often noted for MA and M.Sc. degrees, such as MA (English), MA (Linguistics), M.Sc. (Computer Science), and M.Sc. (Electronics). Universities may set minimum marks for admission, e.g. 50% in the aggregate on the Indian scale from a bachelor's (honours) degree, and require applicants to write an entrance examination.

MA, M.Sc. and M.Com programs usually consist of coursework only, with no thesis requirement. Examinations are held at the end of each year, generally known as Part I Examination (at the end of the first year) and Part II Examination (at the end of second year). Students may be allowed to reappear in the examinations in one or more courses either to make up for failed subjects or for the improvement of marks.

One can study for a master's degree on a part-time basis or externally through distance learning programs. Universities usually prescribe a time limit (e.g. four years) in which students must complete all coursework and pass the examinations to qualify for the award of the degree.

In recent years five-year **integrated master's degrees,** sometimes called bachelor and master dual degree programs, are available in a variety of disciplines such as MA, M.Com, M.Sc. and M.Tech. Entry is based on the completion of higher secondary education (Class 12). Students may have the option to exit the program after three years with a bachelor's degree.

Master's degrees in specialized and professional fields such as engineering and technology generally involve one and a half or two years (three or four semesters) of fulltime study. Entry is based on the completion of a professional bachelor's degree in the same field, though some programs accept a general bachelor's degree. Applicants must meet minimum marks in their undergraduate study and usually have to take a competitive entrance examination. Professional master's degrees enjoy a higher status than general master's degrees (MA, M.Sc. or M.Com) for the purpose of employment and admission into doctoral-level study. Please refer to Programs and Credentials: Specialized and Professional Education for more information.

Master of Philosophy (M.Phil)

The **Master of Philosophy (M.Phil)** is a pre-doctoral research degree that involves one

to two years of fulltime study, with entry based on the completion of a master's degree in at least the Second Division/Class. Some M.Phil programs consist mainly of directed research leading to the completion of a thesis, while others require substantial coursework. Please refer to Appendix 4 for a sample program structure for M.Phil.

The M.Phil degree gives access to employment such as lectureship at a higher education institution, and admission to doctoral programs. Some institutions require an M.Phil for entry into their doctoral programs. An M.Phil holder may complete a Ph.D. program in a minimum of two years, compared with three or more years for a master's degree holder.

Doctor's Degrees

The **Doctor of Philosophy (Ph.D. or D.Phil.)** involves at least two years of fulltime study following the M.Phil or three or more years following a master's degree, and is normally completed within five years after registration. Entry is based on the completion of a master's degree with minimum marks (e.g. 55%), and applicants may be asked to take a qualifying test such as the National Educational Test (NET) conducted by the UGC. Some programs require applicants to hold an M.Phil or prescribe additional coursework in research methodology for students who do not have the M.Phil. Ph.D. study consists mainly of research, though some programs include substantial coursework. Students must complete a substantial thesis based on original research and undergo evaluation and oral examination by a board of examiners.

Examples of other doctoral degrees include Doctor of Education (D.Ed.), Doctor of Engineering (D.Eng.), Doctor of Literature (D.Litt.), Doctor of Science (D.Sc.) and Doctor of Law (DL). The D.Litt. and D.Sc. are usually awarded several years after the Ph.D. on the basis of published research.

Programs and Credentials: Specialized and Professional Education

Engineering and Technology

Three-year diploma courses in engineering and technology are available from polytechnics, with entry based on the completion of secondary school (Class 10). Some programs require the completion of higher secondary school (Class 12) for admission. For more information on such programs, please refer to the next chapter, Vocational and Technical Education.

Bachelor's degrees in engineering and technology such as **Bachelor of Engineering (BE** or **B.Engg.)**, **Bachelor of Technology (B.Tech.)**, **Bachelor of Science in Engineering (B.Sc. Engg.)** and **Bachelor of Science in Technology (B.Sc. Tech.)** involve four years of fulltime study. Entry is based on the completion of higher secondary school, with physics, chemistry and mathematics as required subjects. Holders of three-year diplomas in engineering and technology or a general B.Sc. may be allowed lateral entry into the second year/third semester of the program. Students take about ten courses each semester, including both theoretical subjects and their lab components. They participate in practical training starting from the third year and must complete a major project in the last

semester. A minimum of about 200-220 credits are required for the awarding of the degree. The AICTE prescribes the following course structure for the BE/B.Tech. degree:

- General 5-10%
- Basic science 15-25%
- Engineering sciences and technical arts 15-25%
- Professional subjects 55-65%

Please refer to Appendix 5 for a sample program structure for BE.

The **Master of Engineering (ME** or **M.Engg.)**, **Master of Technology (M.Tech.)** and **Master of Science in Engineering (M.Sc. Engg.)** involve one and a half or two years of fulltime study. Entry is based on the completion of a four-year BE/B.Tech. or an M.Sc. in a related field. Examinations are conducted at the end of each semester. In addition to coursework, students have to complete a major research project.

The **Master of Computer Applications (MCA)** requires three years of fulltime study following the completion of a bachelor's degree. In addition to coursework, students have to complete a major project and/or a thesis. Some institutions offer the four-year integrated MCA program, with entry based on the completion of higher secondary school (Class 12).

Agriculture

Bachelor's and graduate degree programs in agriculture are available at over 100 institutions, including non-agricultural institutions and 45 central and state agricultural universities and agricultural research institutes (deemed universities). The US has played an important role in helping India establish a system of agricultural universities, which tend to show strong American influence such as adoption of the credit system. Agricultural universities are mostly non-affiliating.

A bachelor's degree in agriculture and related disciplines involves four years of fulltime study. Examples include **Bachelor of Science in Agriculture (B.Sc. Agri.)**, **Bachelor of Agriculture (B.Agri.)**, **Bachelor of Science in Horticulture (B.Sc. Hort.)**, **Bachelor of Science in Sericulture (B.Sc. Sericulture)**, and **Bachelor of Technology in Agricultural Engineering (B.Tech Agri. E.)**. The **Bachelor of Veterinary Science and Animal Husbandry (B.V.Sc. & A.H)** involves five years of fulltime study. Total credits required for four-year programs range between 140 and 180, and there is also great variation of credit distribution among different disciplines. In 2000 the Agricultural Education Division of the Indian Council of Agricultural Research published a model curriculum for undergraduate program in agriculture that prescribes a minimum of 161 credits, including physical education but excluding the regional language course. The content of the model curriculum must be followed, allowing 25% regional variation. Please refer to Appendix 6 for a sample program structure for B.Sc. in Agriculture.

Master's degrees in agriculture such as **Master of Agriculture (M.Agri.)** and **Master of Science in Agriculture (M.Sc.Agri.)** involve two years of fulltime study following a bachelor's degree in agriculture. The Indian Council of Agricultural Research prescribes

a minimum of 35 credits of coursework and 15 credits of thesis for such programs.

The **Ph.D. in Agriculture** involves three years of fulltime study following a master's degree in agriculture. The Indian Council of Agricultural Research prescribes a minimum of 25 credits of coursework and 45 credits of thesis for such programs.

Education

The **Bachelor of Education (B.Ed)** can be earned either as a one-year postgraduate bachelor's degree, with entry based on the completion of a first bachelor's degree (BA, B.Sc. or B.Com) or as an integrated four-year course, with entry based on the completion of higher secondary school (Class 12). One may also obtain a B.Ed after completing the first year of a two-year Master of Education (M.Ed) program.

The **Master of Education (M.Ed)** requires one year of fulltime study following the completion of a B.Ed, or two years of fulltime study following the completion of a BA, B.Sc., or B.Com. The completion of the first year of the two-year M.Ed. program leads to the award of a postgraduate B.Ed.

For more information of teacher education programs, please refer to the chapter Teacher Education.

Law

The Bar Council of India (BCI) maintains a list of approved law colleges that provide law education in the form of either the newer five-year integrated program or the traditional three-year postgraduate bachelor's degree, or both.

The postgraduate **Bachelor of Law or Bachelor of Laws (LLB)** involves three years of fulltime study after a first bachelor's degree. According to BCI rules, a three-year LLB (Special/Professional) program must include the following:

- 21 compulsory courses
- At least 3 electives
- 6 months of practical training

Please refer to Appendix 7 for a detailed program structure of the three-year LLB. After completing the program, students may apply to the Bar Council of India to practice law as Advocates. They may also seek admission into two-year Master of Law or Master of Laws (LLM) programs.

Some universities offer a two-year LLB (General/Academic), which does not give access to professional practice or admission into two-year LLM programs; graduates may seek employment in the allied legal profession.

The **Bachelor of Law or Bachelor of Laws (LLB or BL)** integrated program lasts five years, including two years of pre-law study (part I) followed by three years of professional training in law (part II). Applicants who have already completed a first

bachelor's degree (BA, B.Sc. or B.Com) may be admitted into part II of the five-year integrated program. According to BCI rules, part II of the program is identical to the three-year LLB; part I should include the following 6 compulsory subjects:

1. General English - 2 Papers (Part I and Part II)
2. Political Science - 3 Papers (Part I , Part II and Part III)
3. Economics - 1 Paper
4. Sociology - 1 Paper
5. History - 1 Paper
6. History of Courts, Legislature and Legal Profession in India - 1 Paper

After completing the five-year integrated LLB program, students may apply to the Bar Council of India to practice law as Advocates. They may also seek admission into two-year Master of Law or Master of Laws (LLM) programs.

According to BCI rules, students who have completed part I of the five-year integrated program are eligible to enrol in the final year of a three-year Bachelor's degree (e.g. BA, B.Com or B.Sc.), and those who have completed the first three years of the five-year integrated program may receive a degree such as BA (Law) by passing the relevant university examinations. This enables some law colleges to offer combined integrated degrees such as a combined Bachelor of Arts and Bachelor of Law(s) (BA & LLB/BL), a combined Bachelor of Business Administration and Bachelor of Law(s) (BBA & LLB/BL), or a combined Bachelor of Science and Bachelor of Law(s) (B.Sc. & LLB/BL).

Nursing

Three-year certificate/diploma course in **General Nursing and Midwifery (GNM)**, with entry based on the completion of higher secondary school, are mostly offered by institutions attached to hospitals. For more information on such programs, please refer to the next chapter, Vocational and Technical Education.

The **Bachelor of Science in Nursing (B.Sc. Nursing)** or **Bachelor of Nursing (B.Nurs.)** involves four years of fulltime study. Entry is based on the completion of higher secondary school (Class 12), with physics, chemistry, biology and English as required subjects. Please refer to Appendix 8 for a sample program structure for B.Sc. Nursing.

A bridging program called **Post Basic B.Sc. Nursing** is also available for in service nurses who are diploma holders. It involves two years of fulltime regular study or three years in distance learning mode. For example, at the Indira Gandhi National Open University, students enrolled in the three-year Post Basic B.Sc. Nursing program take a total of 10 courses, eight of which have practical components. Teaching is conducted at twenty program study centres set up at existing colleges of nursing. The program is recognized by the Indian Nursing Council and awarded its first batch of degrees in 1998.

Nursing programs are also available at M.Sc., M.Phil and PhD levels. Guidelines and syllabi for various nursing programs are available for sale at the Indian Nursing Council website.

Medicine and Dentistry

The **Bachelor of Medicine/Bachelor of Surgery (MBBS or BMBS)** programs last five and a half years, including a one-year internship. Applicants must pass the higher secondary education certificate examination with physics, chemistry, biology and English as required subjects. In addition, they have to sit a separate pre-medical examination. Those lacking the required subjects may attend a one-year pre-medical course provided by a medical or science college.

The Medical Council of India prescribes the structure and time allocation for medical courses. MBBS program lasts four and a half years or nine semesters, divided into three phases. The first phase (1st to 2nd semesters) consists of pre-clinical subjects such as anatomy, physiology, and biochemistry. The second phase (3rd to 5th semesters) consists of para-clinical subjects such as pathology, pharmacology and microbiology, and clinical subjects. The third phase (6th to 9th semesters) is the continuation of clinical subjects, including medicine and its allied specialties, surgery and its allied specialties, obstetrics, gynaecology and community medicine. A total of three examinations are held: 1st professional examination (2nd semester), 2nd professional examination (5th semester), 3rd professional examination part I (7th semester), and 3rd professional examination part II (9th semester). After passing the last part of the professional examination, students must undergo a 12-month compulsory rotational internship to be eligible for the award of the MBBS degree and full registration with the medical council. In order to become a specialist or medical teacher, one must pursue further study in postgraduate medical programs.

Postgraduate diplomas in medicine approved by the Indian Medical Council involve two years of fulltime study following the completion of a Bachelor of Medicine/Bachelor of Surgery (MBBS or BMBS). Students can choose from 28 fields of specialization such as clinical pathology, obstetrics & gynaecology, ophthalmology, orthopaedics, paediatrics, psychiatry, and radio therapy.

The **Doctor of Medicine (M.D.)** and **Master of Surgery (M.S.)** both involve three years of fulltime study following the completion of a Bachelor of Medicine/Bachelor of Surgery (MBBS or BMBS). Holders of a postgraduate diploma in medicine in the same area of specialization receive one year's advanced standing. Students enrolled in the M.D. program can choose from 29 fields of specialization such as geriatrics, pathology, paediatrics, and radio therapy. Students enrolled in the M.S. program can choose from five fields of specialization including otorhinolaryngology, general surgery, ophthalmology, orthopaedics, and obstetrics & gynaecology.

The **Doctor of Medicine (D.M.)** program involves three years of fulltime study following the completion of an M.D. Students can choose from 12 fields of specialization such as cardiology, immunology, medical oncology and neurology. The **Master of Chirurgie (M.Ch.)** program involves three years of fulltime study following the completion of an M.S. (or an M.D. in some cases). Students can choose from ten fields of specialization such as cardiovascular and thoracic surgery, urology, neurosurgery, and surgical oncology.

The **Bachelor of Dental Surgery (BDS)** involves five years of fulltime study, including one year of internship. Individuals with an MBBS may be able to completion the program in three years. The Dental Council of India prescribes the curriculum structure, syllabi, and examination scheme for the BDS program. Students take a professional examination at the end of each of the first four years. These are known as the 1st, 2nd, 3rd and final BDS examinations. After passing the final BDS examination, students must undergo a one-year rotating internship. The BDS degree entitles an individual to work in general dental practice. Postgraduate study is required for specialization.

The one-year postgraduate diploma in dentistry requires a BDS and a specified period of related work experience for admission. Students may choose from eight areas of specialization including prosthodontics, periodontics, oral surgery, conservative dentistry, orthodontics, community dentistry, paedodontics, and oral medicine & radiology.

The **Master of Dental Surgery (MDS)** involves at least two years of fulltime study, with entry based on the completion of a BDS. Students may choose from nine areas of specialization including prosthodontics, periodontics, oral & maxillofacial surgery, conservative dentistry, orthodontics, oral pathology, community dentistry, paedodontics & preventive dentistry, and oral medicine & radiology.

There are also extensive programs for teaching the Indian systems of medicine (Ayurveda, Siddha, and Unani Tibb) at both undergraduate and graduate levels. The Central Council of Indian Medicine advises the central government on matters relating to the recognition of such programs and prescribes the curricula and syllabi. Many institutions offer the "Ayurvedacharya", or **Bachelor of Ayurvedic Medicine and Surgery (BAMS)** degree, which involves five and a half years of fulltime study, including a clinical internship of 6 or 12 months.

The **Bachelor of Veterinary Science and Animal Husbandry (B.V.Sc. & A.H.)** is the minimum educational qualification to become a veterinary doctor. The Veterinary Council of India (VCI), a statutory body established under the Ministry of Agriculture, prescribes the program structure and syllabus for the B.V.Sc. & A.H. The program involves five years of fulltime study, including a six-month internship, with a total of 188 credits. Earlier programs may have been four and a half years. Entry is based on the completion of higher secondary school or equivalent with Physics, Chemistry and Biology. After completing both coursework and internship, students are eligible for the award of the B.V.Sc. & A.H. degree and full registration with the VCI or state veterinary council to practice as a veterinary doctor. Postgraduate programs such as the two-year Master of Veterinary Science (M.V.Sc.) provide options of specialization.

Management

Management education is offered in the form of bachelor's degree, master's degree, postgraduate diploma, and Ph.D. programs by universities, university-affiliated colleges, and non-university institutions. The AICTE is responsible for certifying management programs in India.

A bachelor's degree in management such as the **Bachelor of Business Administration (BBA)**, **Bachelor of Business Management (BBM)**, and **Bachelor of Business Studies (BBS)** involves three years of fulltime study following the completion of higher secondary school (Class 12). Some institutions require applicants to pass an entrance examination.

There are a variety of master's programs in management such as the **Master of Business Administration (MBA)**, **Master of Management Studies (MMS)**, and **Master of Public Administration (MPA)**. The Master of Business Administration (MBA) usually involves two years of fulltime study following the completion of a bachelor's degree in any discipline. Some programs also have requirements for work experience. Students may choose one or two areas of specialization such as marketing or finance. Admission is usually based on past academic records, entrance examination (such as MAT) score, and an interview. In addition to regular coursework, the program contains practical components such as case studies, fieldwork, and training with an organization approved by the university. Students usually undertake a major project in the last semester.

Postgraduate certificates/diplomas in management cover a wide range of management areas such as general management, financial management, human resource management, and international management. Programs last one, one and a half, or two years fulltime or up to three years on a part-time basis. Entry is based on a bachelor's degree in any discipline, though some specialized programs such as Postgraduate Diploma in Agricultural Business Management (PGDABM) and Postgraduate Diploma in Materials Management (PGDMM) require a bachelor's degree in a related area of specialization.

According to the latest AICTE rules (2007), non-university-affiliated postgraduate programs in management fall into three broad categories:

- **Postgraduate Diploma in Management (PGDM)** involves two years of fulltime study.
- **Postgraduate Diploma in Management for executives (Executive PGDM)** involves 15 months of fulltime study, including 12 months on campus and 3 months of field-based dissertation. Applicants must have a minimum of 5 years relevant managerial/supervisory experience.
- **Postgraduate Certificate in Management (PGCM)** involves at least one year and less than two years of fulltime study.

Two-year postgraduate diplomas at the prestigious Indian Institutes of Management (IIMs), such as **Postgraduate Diploma in Management (PGDM)** and **Postgraduate Diploma in Information Technology and Management (PGDITM)**, are recognized by the Association of Indian Universities (AIU) and the central government as equivalent to university master's degrees for the purpose of employment and admission into doctoral-level programs in management. Please refer to Appendix 9 for a list of 32 institutions (including the IIMs) whose PGDM has been equated with MBA degree by the AIU.

The **Fellow of IIM** is a doctoral-level program offered by IIMs that prepares students for

careers in teaching and research in management or related disciplines. Applicants must hold a bachelor's degree in engineering, a master's degree or an IIM postgraduate diploma. Holders of a master's degree or an IIM postgraduate diploma may request direct admission into the second year. The program usually involves four years of fulltime study. After two years of coursework, students must pass a comprehensive qualifying examination and complete and defend a thesis. The Fellow of IIM is recognized by the AIU and the central government as equivalent to a Ph.D.

Professional Qualifications

Professional bodies in engineering, architecture, management, accounting, etc. award memberships and/or diplomas, some of which are not only recognized for employment purposes but also considered equivalent to academic credentials earned through the higher education system. Membership is usually awarded at several levels based on education completed, success at the qualifying examination, and professional experience. Following are some examples:

The **Institution of Engineers India (IEI)** offers a variety of individual and institution memberships. Completion of the Section A and Section B Examinations for the Associate Membership (renamed Graduate Membership on February 1, 2006) is considered equivalent to a bachelor's degree in engineering for employment purposes and for admission into further education. The IEI also offers postgraduate diploma programs in selected engineering disciplines in collaboration with a deemed university.

The **Indian Institute of Architects (IIA)** offers memberships of different levels including students, licentiates, associates, and fellows. It administers examinations twice a year for candidates of associate memberships. The associate membership, known as Associate of the Indian Institute of Architects (AIIA), is recognized by the central government as equivalent to a Bachelor of Architecture degree for employment purposes.

The **Institute of Chartered Accountants of India (ICAI)** conducts a scheme of education and training for the profession of chartered accountants including entry level courses, professional competency course and final course. Successful candidates in the final course examination become ICAI members and may seek employment or set up their own practice. The ICAI membership is recognized by some institutions for admission into doctoral study. ICAI also offers its members post qualification diploma courses in areas such as management accountancy, corporate management and tax management. These diplomas are considered by the AIU as equivalent to a master's degree if the holder has earned a bachelor's degree previously.

The Centre for Management Education of the **All India Management Association (AIMA)** offers various programs in management including the six-month advanced diploma, one-year professional diploma, two-year postgraduate diploma, and Ph.D. in Business Administration (since 2000).

Other notable professional bodies include:

– Indian Institute of Chemical Engineers (IIChE)

- Indian Institute of Metal (IIM)
- Institute for Financial Management and Research (IFMR)
- Institute of Chartered Financial Analysts of India (ICFAI)
- Institute of Company Secretaries of India (ICSI)
- Institute of Cost and Works Accountants of India (ICWAI)
- Institution of Electronics and Telecommunications Engineers (IETE)
- National Council for Hotel Management and Catering Technology (NCHMCT)
- National Council of Cement and Building Materials (NCB)
- National Institute for Entrepreneurship and Small Business Development (NIESBUD)
- National Institute of Industrial Engineering (NITIE)
- National Productivity Council (NPC)

Vocational and Technical Education

Overview

Technical Education

Technical education in India refers to programs ranging from sub-degree (certificate or diploma) to postgraduate levels in technical fields that fall under the purview of the All India Council for Technical Education (AICTE) as stipulated by the *AICTE Act* of 1987:

- Engineering & Technology
- Management
- Computer Applications
- Architecture & Town Planning
- Pharmacy
- Hotel Management & Catering Technology
- Applied Arts and Craft

Technical education programs at the first degree and postgraduate levels, such as Bachelor of Engineering (BE), Master of Engineering (ME) and Postgraduate Diploma in Management (PGDM) have been discussed in the previous chapter, Higher Education.

This chapter covers technical education at the sub-degree level, sometimes called technician education. It is mainly conducted by polytechnics in the form of three-year diploma courses in engineering and technology, with entry normally based on the completion of secondary school (Class 10). Holders of a diploma in engineering and technology may be allowed lateral entry into the second year of a four-year Bachelor of Engineering (BE) or Bachelor of Technology (B.Tech) program.

Some polytechnics and colleges offer higher diplomas, often called post diplomas or advanced diplomas, which last one to two years, with entry based on the completion of a first diploma or a bachelor's degree. In some cases, when combined with a first diploma in the same field of study, a higher diploma may be considered equivalent to a bachelor's degree for employment purposes. Some professional associations offer memberships that are considered equivalent to a diploma or higher diploma in technical education.

Vocational Education

Vocational education in India generally refers to programs from secondary school to university levels that prepare students for employment or self-employment in various technical and non-technical sectors.

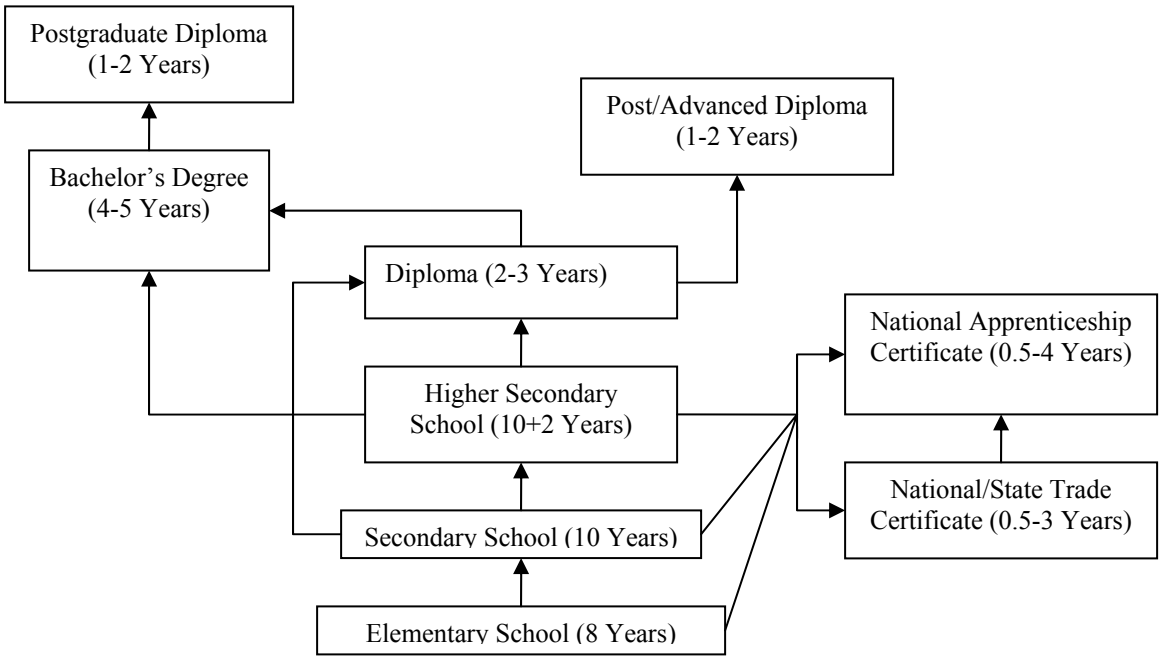
While work-related education is an integral part of school curriculum at all stages, vocational education in the form of specialized vocational subjects is first introduced in secondary school (Classes 9-10). The higher secondary stage (Classes 11-12) divides into the academic stream and the **vocational stream**, with the latter enrolling about five percent of the students. The vocational stream prepares students for employment or self-employment in "unorganized" or unregulated sectors.

For employment in the designated trades, the **Craftsmen Training Scheme** offers programs lasting from six months to three years mainly at industrial training institutes (ITIs), with entry usually based on the completion of secondary school. Successful completion of craftsmen training leads to the National Trade Certificate (NTC) or State Trade Certificate.

Further training in the trades is available through the **Apprenticeship Training Scheme**, with programs lasting from six months to four years. Successful completion of trade apprenticeship training leads to the National Apprenticeship Certificate (NAC). As will be discussed later, the Apprenticeship Training Scheme in India not only covers training in the designated trades but has been expanded to include on-the-job training in various technical and vocational fields at levels ranging from elementary school (Class 8) to bachelor's degree.

Vocational education at the university level is available through programs such as BA, B.Sc. and B.Com in vocational studies.

Figure 5. Outline of Vocational and Technical Education System



Administration

The development of vocational education and training is the joint responsibility of the central and state governments. The central government, mainly through the Ministry of Labour and Employment, develops training schemes at the national level, formulates policies and guidelines, sets standards and norms, and conducts examinations. The **Directorate General of Employment and Training (DGET)** of the Ministry of Labour and Employment is responsible for implementing vocational training policies at the national level. It develops and implements the national vocational training system, which

includes training programs for craftsmen, apprentices, and instructor trainees. The operation of the training schemes, including the administration of Industrial Training Institutes (ITIs), rests largely with the state governments.

The **National Council for Vocational Training (NCVT)**, established in 1956, is the agency that advises the central government on vocational training policy and coordinates training programs throughout the country. It prescribes standards and curricula for craftsmen training, conducts the All India Trade Test that awards the National Trade Certificates and the All India Apprenticeship Test that awards the National Apprenticeship Certificates, and approves government and private training institutions. The council is chaired by the Minister of Labour and Employment and has representatives from the central and state governments, employers, and workers. State Councils for Vocational Training (SCVT) are constituted for the same purpose by respective state governments.

The **National Council of Educational Research and Training (NCERT)** advises the central and state governments on academic matters relating to school education. It formulates the National Curriculum Framework and develops syllabi and textbooks for schools. It coordinates development and standards in vocational school education, including courses for the vocational stream of higher secondary stage.

The **All India Council for Technical Education (AICTE)** is responsible for planning, development and maintaining standards in technical education at all levels ranging from certificates and diplomas to postgraduate degrees. It prescribes norms and standards for technical education programs and provides some model curricula. The *AICTE Act* stipulates that any institution offering technical education programs must have AICTE approval. The AICTE website provides a list of approved institutions and a non-exclusive list of unapproved institutions.

The state governments administer the polytechnics that provide technical education at the certificate and diploma level. The State Directorates of Technical Education (DTE) are responsible for funding, policy, and administration of polytechnics. In many states the directorates are complemented by boards or councils of technical education. These boards have academic functions such as curriculum development, conduct of examinations, awarding of diplomas, and institutional evaluation, accreditation and certification.

Vocational Study in School Education

General work-based education is an integral part of the school curriculum at all the states and union territories. It is known by various names such as work education, socially useful productive work (SUPW), life oriented education, etc. It involves children in a variety of production or service oriented activities to develop work-related attitudes and values as well as vocational proficiency. Specialized vocational subjects, though introduced at the secondary stage in some schools, are mostly available in the higher secondary stage.

Secondary Stage

Some schools introduce specialized vocational subjects at the secondary stage. For example, a number of technical and industrial arts and crafts schools located mainly in the states of Andhra Pradesh, Karnataka, Kerala, Maharashtra and Gujarat offer vocational subjects in addition to the general curriculum that prepares students for the secondary school certificate examination. Students may choose to learn the theory and practice of a trade such as carpentry, welding, plumbing, and building construction. They are usually called pre-vocational programs, as after completing such a program, students generally continue their study at a higher secondary school or polytechnic rather than immediately seek employment in vocational fields.

Higher Secondary Stage

Vocational study as a distinctive stream at the higher secondary stage (+2) was first proposed in the 1968 National Policy on Education (NPE). In 1976 a centrally sponsored scheme for vocational programs at the +2 level was launched, with support from many state governments. However, it encountered difficulties and was discontinued in 1979. The 1986 NPE reiterated that vocational education should be a distinct stream that are normally provided after the secondary stage (Class 10) but may be made available after Class 8. A centrally sponsored scheme for vocational programs known as the "vocalization of secondary education" was initiated in 1988 with financial provision from the central government. The 1986 NPE envisioned that vocational education would be expanded to cover 25 percent of higher secondary students by 2000. However, due to the perceived inferior status of vocational education, only about five percent of higher secondary students chose the vocational stream in 2000.

As school education evolved largely at the state level, vocational education at the higher secondary stage shows variations in terms of administrative structure, curriculum, and educational provider (e.g. higher secondary schools, colleges, and vocational education institutes). However, there is no problem in equivalence across states, as students in the vocational stream generally sit the same higher secondary certificate examinations conducted by the state boards as those in the academic stream. Since the implementation of the National Policy on Education of 1986, most states have brought their vocational education structure within the National Curriculum Framework.

The National Curriculum Framework of 2000 divides the higher secondary stage into the general/academic stream and the vocational stream as discussed in a previous chapter, School Education. In the academic stream, work education is listed as a component of the foundation courses. This includes the Generic Vocational Course that cuts across various vocations and aims at developing employment-related generic skills needed by an educated work force regardless of a person's occupation.

The vocational stream of the higher secondary stage spends about 15 percent of instructional time on language(s) and another 15 percent on general foundation courses. The remaining 70 percent instructional time is devoted to vocational electives, which are designed as self-contained modules covering both theoretical aspects or basic scientific

principles and practical operational details. They aim at developing skills and knowledge required for employment in a specific occupation or a group of occupations and for self-employment and entrepreneurship. Students can choose from a large number of courses grouped into broad areas of study such as agriculture, engineering and technology (including information and communication technology), business and commerce, home science, health and paramedical services, and humanities. The vocational stream also provides opportunities for part-time and evening study and caters for the needs of socially disadvantaged groups such as out-of-school girls and the Scheduled Castes and Tribes. Upon completion of the vocational stream of higher secondary education, students sit external examinations administered by the state board or one of the three All-India boards.

Certificate of Vocational Education – Year 12

One of the All-India boards, the Council for the Indian School Certificate Examinations (CISCE), has created a separate examination for vocational stream students: **Certificate of Vocational Education – Year 12 (CVE-12)**. Candidates may take this examination after a two-year course beyond the Indian Certificate of Secondary Education Examination (ICSE) or its equivalent, through the medium of English. The certificate is intended to prepare candidates for particular occupations.

Compulsory subjects for CVE-12 include:
- English: Paper I and Paper II
- General Foundation, Industrial Sociology & Entrepreneurship

Optional subjects for CVE-12 include:
- Mechanical Engineering Technician
- Civil Engineering Technician
- Telecommunication Engineering Technician
- Computer Theory & System Analyst
- Business Studies
- Air Conditioning and Refrigeration
- Offset Printing Technician
- Graphic Designing Technician
- Physical Education
- Crèche & Pre-primary School Management
- Hospitality Management
- Exterior & Interior Design
- Office Assistant

Craftsmen Training Scheme

Craftsmen Training at ITIs

The Ministry of Labour initiated the Craftsmen Training Scheme in 1950 by establishing about 50 **Industrial Training Institutes (ITIs)** to train semi-skilled and skilled workers. Currently India has a network of 4,971 ITIs, of which 1,869 are run by the government and 3,102 privately run, with a total enrolment of 718,000.[26] Training at government ITIs is either provided for free or charges a nominal fee. Candidates for training should

usually be between 14 and 25 years of age. There are guidelines for the reservation of places for candidates from disadvantaged groups such as the Scheduled Castes and Scheduled Tribes, the physically handicapped and women.

The ITIs impart training in 49 engineering and 49 non-engineering trades according to the Craftsmen Training Scheme. Admission requirements vary from Class 8 to Class 12, depending on the trade, and training periods normally last from one to three years, though six-month training is available for B.Sc. holders in a few trades. Please refer to Appendix 10 for a complete list of the craftsmen trades along with their entry requirements and length of training.

The ITIs that meet the facilities standards are granted affiliation by DGET, whose website provides a list of affiliated ITIs by states/union territories. They must follow the curriculum prescribed by the National Council for Vocational Training (NCVT), with about 70% of the time devoted to practical training and 30% to theory. Upon completion of their training, students take the All India Trade Test administered by the NCVT to receive the **National Trade Certificate**, which is recognized by the central and state governments for recruitment to their relevant posts and services, or they can take the State Trade Test administered by the State Council for Vocational Training (SCVT) to receive the **State Trade Certificate**. The marks obtained by the candidates are only indicated on the provisional certificates issued soon after they pass the test.

Craftsmen training is linked to the Apprenticeship Training Scheme in 92 trades. Those who have completed craftsmen training at the ITIs may be engaged by employers for apprenticeship training in the designated trades. Such trainees are given full credit for the period spent in the ITIs and they are required to undergo training only for the remaining period of apprenticeship.

Craftsmen Training Institutes under DGET

In addition to the ITIs, which are administered by the state governments, craftsmen training is also provided by a number of central and regional institutes under the DGET:

- Six Model Training Institutes (MTIs) attached to the Advanced Training Institutes (ATIs) at Ludhiana, Calcutta, Hyderabad, Mumbai & Kanpur and Central Training Institute for Instructors at Chennai.
- National Vocational Training Institute (NVTI) for Women at Noida, Uttar Pradesh.
- Ten Regional Vocational Training Institutes (RVTIs) for Women at Mumbai, Bangalore, Tiruvananthapuram, Hissar, Calcutta, Tura, Indore, Allahabad, Vadodara and Jaipur.
- Four Model Industrial Training Institutes (MITIs) provide modular training courses in the following three specialised areas. This type of training has the advantage of adapting readily to the changing needs of industry.
    - Mechanical group of trades at Haldwani, Uttar Pradesh and Chowdwar, Orissa.
    - Heat Engines group of trades at Jodhpur, Rajasthan.
    - Electrical & Electronics group of trades at Calicut, Kerala.

Advanced Vocational Training and Craft Instructor Training

Launched in 1977, the Advanced Vocational Training Scheme offers short-term advanced training to upgrade and update the skills of serving industrial workers. Training programs lasting from one to six weeks in selected skill areas are available from six Advanced Training Institutes (ATIs) under the DGET and 30 ITIs from various states. The ATIs also provide training programs for craft instructors at ITIs. These include one-year courses, short-term refresher courses, and modular training courses lasting three or six months.

Apprenticeship Training Scheme for Trade Apprentices

The Apprenticeship Training Scheme was first initiated in 1959 on a voluntary basis, followed by the enactment of the *Apprentices Act* in 1961 for the training of trade apprentices. It is obligatory for employers in both the public and private sectors with the requisite training facilities to engage apprentices.

The Directorate General of Employment and Training (DGET) of the Ministry of Labour and Employment has overall responsibility for apprenticeship training. It implements the *Apprentices Act* for trade apprentices at central government departments and undertakings through six Regional Directorates of Apprenticeship Training. The Central Apprenticeship Council advises the government on policies and prescribes standards and syllabi for the apprentice training scheme. State apprenticeship advisers implement the *Apprentices Act* for trade apprentices at state government departments and undertakings and private enterprises.

The Apprenticeship Training Scheme for trade apprentices covers a total of 153 designated trades. Entry requirements vary from Class 8 to Class 12, and period of training lasts from six months to four years. As mentioned earlier, apprenticeship training is linked to craftsmen training in 92 trades, with reduction in period of training available to ITI graduates in relevant trades.

Apprenticeship training comprises basic training, shop floor training and related instructions. Shop floor training is provided by employers. Basic training is conducted by large employers, Basic Training Centres, and ITIs. Related instructions are provided by Related Instruction Centres. Individuals who have completed their apprenticeship training take the All India Apprenticeship Test administered by National Council of Vocational Training (NCVT) to receive the **National Apprenticeship Certificate**. The National Apprentice Certificate is of a higher grade than the National Trade Certificate and may be given preference in the selection of candidates for government jobs.

Apprenticeship Training Scheme for Non-Trade Apprentices

As mentioned earlier, the term "apprenticeship training" in India covers not only the designated trades but a wide range of other technical and vocational fields as well. The *Apprentices Act* defines apprenticeship training as "a course of training in any industry

or establishment undergone in pursuance of a contract of apprenticeship". Enacted in 1961 for trade apprentices, the Act was amended in 1973 and 1986 to include three other apprentice categories:

- Graduate apprentices: holders of bachelor's degree in engineering and technology
- Technician apprentices: holders of diploma in engineering and technology
- Technician (vocational) apprentices: higher secondary graduates of the vocational stream

Apprenticeship training is not available to holders of bachelor's degree in engineering and technology who have at least one year's job or training experience after obtaining the degree, or diploma holders who have gone through the "sandwich course" that incorporates about one year of industrial training.

The Ministry of Human Resources Development implements the *Apprentices Act* for graduate, technician and technician (vocational) apprentices through four Boards of Apprenticeship Training at Kanpur, Kolkata, Mumbai and Chennai.

Training for graduate and technician apprentices covers 101 subject fields such as civil engineering, mechanical engineering, computer engineering, agricultural engineering, architecture, leather technology, and interior decoration. The period of training is one year. Successful completion of training leads to a certificate awarded by the Ministry of Human Resource Development.

Training for technician (vocational) apprentices covers 94 subject fields such as accountancy & auditing, banking, food preservation, nursing, child care and nutrition, sericulture, agriculture, X-Ray technology, dental hygiene, dental technology, and pharmacy. The period of training is one year. Successful completion of training leads to a certificate awarded by the Ministry of Human Resource Development.

Overview of Sub-Degree Programs in Technical Education

Technical education at the sub-degree level, mainly conducted by polytechnics, includes diploma/certificate programs in a wide range of fields under the purview of the AICTE, such as engineering and technology, architecture, computer applications, applied arts and craft, and pharmacy. The history of polytechnic education dates back to the early British colonial period, when technical and engineering schools were established to meet the needs for technical personnel. Since Independence, polytechnic education has expanded rapidly to meet the needs of industrialization.

The AICTE provides a broad framework of norms and standards for polytechnic education regarding program structure, facilities, human and financial resources, etc. However, program structure and entry requirements may vary from state to state, as the State Councils/Boards of Technical Education set program standards for polytechnics under their jurisdiction, administer the major examinations and award the diplomas. While most polytechnics are funded by the central and state governments, hundreds of

self-financing, for-profit institutions have been set up since the 1980s; some of those do not have AICTE approval. Many institutions offer programs in a variety of disciplines such as engineering, electronics, computer science, medical lab technology, hotel management and catering technology, etc. There are also a number of single-discipline institutes in areas such as leather technology, sugar technology, and textile design. Traditionally, students who seek admission into polytechnics come from comparatively poor socioeconomic backgrounds.

Teacher Education

Four **Technical Teachers' Training Institutes (TTTIs)** at Bhopal, Calcutta, Chandigarh and Madras were established in 1967 to promote polytechnic education. Later renamed **National Institutes of Technical Teachers' Training and Research (NITTTRs)**, they conduct a variety of short-term and long-term training programs for polytechnic teachers in engineering and technology, instructional methodology, and education management. They are also involved in educational research, development of curriculum and instructional materials, and promoting industry-school interaction. One of their long-term programs is the 1.5-year (3-semester) **Master of Technical Education (M.Tech.Ed.),** recognized by AICTE as a desirable qualification for teaching and administrative posts at polytechnics. Entry requirements include a BE/B.Tech in First Class and three years of related work experience.

Diploma Courses

Diploma courses in various technical fields last two to three years following the completion of Class 10 or Class 12. They aim to train supervised technicians and other middle level technical personnel for a range of professional duties. Successful completion of the programs leads to a diploma awarded by the State Council/Board of Technical Education.

The diploma in engineering and technology generally involves three years of fulltime study, with entry based on the completion of Class 10. Examples of exceptions: Rajasthan requires Class 12 for admission. In Assam and Tamil Nadu, applicants may enter a three-year program after Class 10 or two-year program after Class 12.

The diploma in pharmacy involves two years of fulltime study, with entry based on the completion of Class 12. Before 1994, entry was based on the completion of Class 10. The diploma in library science also involves two years of fulltime study following the completion of Class 12.

The diploma courses in a few technical areas including architecture and town planning, hotel management and catering service, modern office practice, and computer engineering involves three years of fulltime study following the completion of Class 12.

Diploma programs are also available in other technical fields such as interior design, textile design, travel and tourism, secretarial studies, and medical laboratory technology. Program length is usually two or two and a half years following the completion of Class 10.

Higher Diplomas
Polytechnics and other institutions also offer higher-level diplomas lasting six months to two years, with entry based on a previous diploma or a bachelor's degree. They may be called **Post Diplomas**, **Advanced/Advance Diplomas**, or simply diplomas. Where entry must be based on a bachelor's degree, the program is called a **Postgraduate Diploma** or a **Post B.Sc. Diploma**, as the case may be.

Post diploma programs generally involve one to one and a half years of fulltime study, with entry based on a previous diploma or bachelor's degree. Programs are available in some specialized areas in engineering and technology or other technical disciplines such as:
- Civil Engineering
- Mechanical Engineering
- Industrial Engineering
- Computer Engineering
- Information Technology
- Refrigeration and Air Conditioning
- Textile Manufacturing
- Fashion Technology
- Interior Decoration
- Mass Communication

Advanced diploma programs generally involve six months to two years of fulltime study, with entry based on a previous diploma or bachelor's degree. They are available in some emerging and specialized areas engineering and technology or other technical disciplines such as:
- Die and Mould Making
- Tool Engineering
- Hospital Engineering and Application
- Plant Maintenance Engineering

Postgraduate diploma programs generally involve one to one and a half years of fulltime study, with entry usually based on a bachelor's degree. With a few exceptions such as the two-year postgraduate diplomas from Indian Institutes of Management (IIMs), postgraduate diploma holders do not have advanced standing when applying to master's degree programs. Postgraduate diplomas from polytechnics are available in a few specialized fields such as:
- TV Technology
- Textile Chemistry
- Water Resource Development
- Industrial Management

Examples of Sub-Degree Programs in Technical Education

Engineering and Technology

In most states, the diploma in engineering and technology involves three years of fulltime study following the completion of Class 10. The AICTE prescribes the following guidelines regarding the program structure of the diploma in engineering and technology:

Table 28. AICTE Guidelines for Three-Year Diploma in Engineering and Technology[27]

Components and Time Allocation	Description
General Studies (5-10%)	Courses in general studies may be related to supervisory, management and communication skills, and should include areas of social and economic concern such as environmental protection, energy conservation, productivity and quality, safety and entrepreneurial development. A general course on computer literacy and computer applications should also be included.
Applied Sciences (10-15%)	Mathematics, Physics, Chemistry and other relevant science disciplines. Topics for these courses will be chosen depending on their importance for further study of basic and applied courses in engineering/ technology, as well as to help the students to pursue higher-level studies in chosen areas.
Basic Engineering/ Technology (20-30%)	Engineering Drawing, Workshop Practice, Applied Mechanics, Strength of Materials, Fluid Mechanics and basic elements of allied disciplines.
Applied Engineering/ Technology (40-55%)	The core studies relevant to the specific discipline meant to develop competencies required by the profession. The Project work provides opportunity for students to develop understanding of the interrelationship between courses and to apply the knowledge gained in a way which enables them to develop and demonstrate higher order skills. Industry-Institution interaction should be an integral component of curriculum wherever possible.
Specialized Courses (Electives) (5-10%)	They provide for specialization in an area of the student's choice and should cover new and emerging areas of technology. Examples include Environmental Engineering (Civil), Computer Aided Manufacture (Mechanical), Automatic Controls (Electrical), Microprocessors (Electronics), etc.

The state board/council of technical education conducts major examinations and awards the diplomas. Please refer to Appendix 11 for two sample program structures of three-year diploma in civil engineering from the states of Kerala and Punjab respectively.

In addition to three-year fulltime programs, part-time programs lasting up to four years through evening school or distance learning are also available for students already in the workforce. Some fulltime courses are available in the sandwich pattern, which incorporates industrial training between semesters and lasts three and a half to four years.

Holders of the diploma in engineering and technology may seek employment, e.g. by undertaking a one-year "technician apprentice" training through the Apprenticeship Training Scheme. They can also pursue further education at universities or through professional associations such as the Institution of Engineers India (IEI). Some universities allow them lateral entry into the second year/third semester of a bachelor of engineering/technology program in the same field.

Business and Management

Modern business education in India began during the British rule, with the first college-level business schools established in the early 20th century. After Independence, the government introduced the commerce stream at the higher secondary level. Traditionally, business education programs such as B.Com focused on the commercial side of business and emphasized skills and knowledge relating to business transactions and processes. The 1980s saw the emergence of management education such as MBA and BBA, which focuses on overall business functions and management principles and prepares students for executive level positions. The AICTE prescribes norms and standards about various levels of management education. Following are some examples of business and management programs at the sub-degree level.

The **Diploma in Hotel Management and Catering Technology** involves three years of fulltime study following the completion of Class 12. The program is available at some polytechnics and the National Council for Hotel Management and Catering Technology. The council is planning to offer a one-year Post Diploma in Hotel Management and Catering Technology for three-year diploma holders, which will be considered equivalent to a four-year Bachelor's Degree in Hotel Management and Catering Technology.

The **Diploma in Modern Office Practice** involves three years of fulltime study, including six months of industrial training, following the completion of Class 12. Please refer to Appendix 12 for a sample program structure.

The Centre for Management Education of the **All India Management Association (AIMA)** offers the following certificate/diploma programs in management:

- **Advanced Diploma in Management**: It is offered in various areas of management including finance, marketing, human resource development, and enterprise management. Entry is based on a three-year diploma or a bachelor's degree in any discipline. The program lasts six months fulltime, though students are allowed a maximum of one and a half years to complete all assignments and case studies.
- **Postgraduate Certificate in Management**: It is offered in the areas of human resource development, international business, marketing, finance, retail management, travel & tourism, and pharmaceutical marketing. Entry is based on a three-year diploma or a bachelor's degree in any discipline. The program lasts one year, comprising two sixth-month modules.
- **Postgraduate Diploma in Management**: Entry is based on a bachelor's degree in any discipline. The program lasts two years, comprising four six-month modules. The first, second and fourth modules are common to all students, while the third module provides the option to specialize in one of seven areas: marketing, finance, international business, human resource, operations, information systems, and insurance. A certificate is awarded upon completion of each module:
    1. Diploma in Management (Module 1)
    2. Advanced Diploma in Management (Module 2)
    3. Professional Diploma in Management (Module 3)
    4. Postgraduate Diploma in Management (Module 4)

Computer Education

India boasts a booming information technology sector, with computer education constituting an important part of the education system. Programs ranging from sub-degree to postgraduate levels are offered by universities, university-affiliated colleges, professional associations, polytechnics, and private computer institutes. The following table gives some examples of computer programs and their usual lengths and entry requirements. Generally speaking, programs in **computer applications** and **information technology** deal with the applied part of computing and admit students from different backgrounds, while other programs such as **computer science**, **computer science and engineering**, and **software engineering** require previous computer education for admission into higher level courses.

Table 29. Examples of Computer Education Programs

Program	Length (year)	Entry Requirements
DOEACC-accredited O, A, B, C level courses	1-3	Varies – see next table
Diploma in Computer Applications (DCA)	1	Class 12
Diploma in Computer Science and Engineering (DCSE)	3	Class 10 (with science subjects)
Bachelor of Computer Applications (BCA)	3	Class 12 (with Math)
B.Sc. in Computer Science	3	Class 12 with Math
Bachelor of Computer Science and Engineering (BCSE)	4	Class 12 with science subjects
BE/B.Tech in Computer Science	4	Class 12 with science subjects
Postgraduate Diploma in Computer Applications (PGDCA)	1	Bachelor's degree (+ Class 12 Math)
Postgraduate Diploma in Computer Science (PGDCS)	1	Bachelor's degree (+ Class 12 Math)
Postgraduate Diploma in Software Engineering (PGDSE)	1	B.Sc. in Computer/Math
Master of Computer Applications (MCA)	3	Bachelor's degree + Class 12 Math/Bachelor paper in Math
M.Sc. in Information Technology	2	Bachelor's degree + Class 12 Math
M.Sc. in Computer Science	2	B.Sc. in Computer Science
M.Tech in Computer Science	1.5-3	BE, B.Tech, B.Sc. (Engg.), M.Sc., MCA, or AMIE associate membership, etc.
Ph.D. in Computer Science	3-5	ME/M.Tech/M.Sc. or BE/B.Tech

Diploma programs in computer science and engineering, available at polytechnics and university-affiliated colleges, involve three years of fulltime study, with entry usually based on the completion of Class 10 with science subjects. Diploma programs in computer applications, usually available at university-affiliated colleges, involve one year of fulltime study, with entry based on the completion of Class 12. Please refer to Appendix 13 for sample program structures of Diploma in Computer Engineering and Diploma in Computer Applications.

The polytechnic diploma may be followed by a post diploma, sometimes called post-polytechnic diploma, which involves one to one and a half years of fulltime study.

Some professional associations offer diploma-level memberships that can be obtained by

passing an examination administered by the association. For example, the Institution of Electronics and Telecommunications Engineers (IETE) offers the diploma level membership (DIPIETE) in the computer science and engineering stream, which is recognized by the Government of India as equivalent to a diploma for employment purposes.

Postgraduate diplomas in computer education are offered by universities, university-affiliated colleges, IITs, and some professional associations and polytechnics. They usually involve one year of fulltime study, with entry based on a bachelor's degree, though some programs admit diploma holders.

DOEACC Accredited Computer Courses

India has hundreds of private computer training institutes offering a wide range of courses from computer fundamentals to advanced computer languages. Course contents and teaching quality vary greatly from institute to institute. The DOEACC society grants accreditation to private computer institutes that meet prescribed norms and standards for conducting specified levels of courses. Founded in 1994, DOEACC (Department of Electronics Accreditation of Computer Courses) is an autonomous body of the Department of Information Technology (formerly Department of Electronics) of the Ministry of Communications and Information Technology. DOEACC accreditation is a joint scheme of the All India Council for Technical Education (AICTE) and the Department of Information Technology.

Under the DOEACC scheme there are four main levels of courses (O, A, B, C) conducted by accredited private institutes as well as ten DOEACC centres at Aurangabad, Aizawl, Calicut, Chandigarh, Gorakhpur, Tezpur/Guwahati, Imphal, Kolkata, Jammu/Srinagar and Kohima. The DOEACC website provides lists of accredited institutes for different levels of courses.

Table 30. DOEACC-accredited Computer Courses

Level	Equivalence	Examination Eligibility		Course Length	Career Path
		Applicants from Accredited Institute	Direct Applicants		
O	Foundation level course in Computer Applications – recognized by Government of India for employment purposes	• Class 12, or • Class 10 + ITI, or • Completion of 2nd year of polytechnic engineering diploma Followed by completion of Level O course in each case	• Class 12 + 1-year relevant experience, or • Class 10 + ITI + 1-year relevant experience, or • NCVT certificate in Data Preparation & Computer Software	1 year	Assistant Programmer EDP Assistant Web Designer Lab Demonstrator
A	Advanced Diploma in Computer Applications (ADCA) – recognized by Government of India for employment purposes	• Level O certificate, or • Class 10 + polytechnic engineering diploma, or • Bachelor's degree Followed by completion of Level A course in each case	• Level O certificate + 1-year relevant experience, or • Polytechnic engineering diploma + 1-year relevant experience, or • Bachelor's degree + 1-year relevant experience	1 year	Programmer Web Administrator Training Faculty Web Content Developer Trouble Shooter
B	Master of Computer Applications (MCA) – recognized by AICTE	• Level A certificate, or • Post-Polytechnic Diploma in Computer Applications (PPDCA), or • Postgraduate Diploma in Computer Applications (PGDCA), or • Bachelor's degree Followed by completion of Level B course in each case	• Level A certificate + 2-year relevant experience, or • Post-Polytechnic Diploma in Computer Applications (PPDCA) + 2-year relevant experience, or • Postgraduate Diploma in Computer Applications (PGDCA) + 2-year relevant experience • Bachelor's degree + 3-year relevant experience, or • Polytechnic engineering diploma + 3-year relevant experience	3 years	System Analyst Database Administrator Software Engineer Senior Faculty Network System Administrator
C	Master of Technology (M.Tech) – recognition pending	• Level B certificate, or • B.Tech/BE/MCA/M.Sc., or • Master's degree in Mathematics /Statistics / Operations Research, or • MBA + B.Sc./BA (Mathematics / Statistics), or • Graduate Aptitude Test in	• Level B certificate + 1.5-year relevant experience, or • B.Tech/BE/MCA/M.Sc. + 1.5-year relevant experience, • Master's degree in Mathematics /Statistics / Operations Research, + 1.5-year relevant experience, or • MBA + B.Sc./BA (Mathematics /	1.5 years	Project Manager IT Consultant R & D Scientist System Specialist

		Engineering (GATE) (Computer) Followed by completion of Level C course in each case	Statistics) + 1.5-year relevant experience, or • Graduate Aptitude Test in Engineering (GATE) (Computer) + 1.5-year relevant experience		

Health and Paramedical Education

A few national councils such as the Indian Nursing Council, the Indian Pharmacy Council, and the Indian Dental Council regulate the training programs in their respective areas. Programs in other health and paramedical areas are conducted by state health departments.

Nursing

The Indian Nursing Council prescribes course guidelines and syllabi for nursing education programs including certificate/diploma, B.Sc., Post Basic B.Sc., M. Sc., M.Phil and Ph.D.

The **ANM (Auxiliary Nursing and Midwifery)** certificate/diploma program involves two years of fulltime study, with entry based on the completion of secondary school (Class 10). After completing the program, students must pass examinations administered by the state nursing council or the state directorate of medical education. ANM diploma holders usually work as community health workers at village subcentres.

The **GNM (General Nursing and Midwifery)** certificate/diploma program involves three and a half years of fulltime study, with entry based on the completion of higher secondary school (Class 12). After completing the program, students must pass examinations administered by the state nursing council, the state directorate of medical education, or the state examination board before they can register with the state nursing council. GNM diploma holders may pursue further education by applying to Post Basic B.Sc. Nursing that involves two years of fulltime regular study or three years in distance learning mode.

Pharmacy

The Pharmacy Council of India (PCI) prescribes the structure and syllabi for the diploma program and provides a list of approved diploma institutions. The **Diploma in Pharmacy (D.Pharm.)** involves two years of fulltime study followed by 500 hours of practical training. Entry is based on the completion of higher secondary school (Class 12) with Physics, Chemistry, Biology or Math as required subjects. The entry requirement of Class 12, as per PCI education regulations of 1991, applies to pharmacy students graduating in 1994 or later. Previous programs required Class 10 for admission. Examinations are held at the end of the first year (Part I Examination) and the second year (Part II Examination).

Table 31. Program Structure, Diploma in Pharmacy, Pharmacy Council of India[28]

Year	Subject	Hours (Theory)	Hours (Practical)
1st	Pharmaceutics I	75	100
	Pharmaceutical Chemistry I	75	75
	Pharmacognosy	75	75
	Biochemistry & Clinical Pathology	50	75
	Human Anatomy & Physiology	75	50
	Health Education & Community Pharmacy	50	—
	Subtotal	400	375
2nd	Pharmaceutics II	75	100

	Pharmaceutical Chemistry II	100	75
	Pharmacology & Toxicology	75	50
	Pharmaceutical Jurisprudence	50	—
	Drug Store and Business Management	75	—
	Hospital and Clinical Pharmacy	75	50
	Subtotal	450	275

The D.Pharm. holder must register with the state pharmacy council to stock, sell, and dispense medicine according to doctor's prescription. D.Pharm. holders may be admitted directly into the second year of the four-year **Bachelor of Pharmacy (B.Pharm.)** program but must pass the first year subjects that are not covered in the diploma program.

Dentistry

The Dental Hygienist Certificate and Dental Mechanics Certificate both involve two years of fulltime study, with entry based on the completion of secondary school (Class 10). The Dental Council of India prescribes the structure and course syllabi for the certificate programs.

The **Dental Hygienist Certificate** program lasts two years. Students must pass two major examinations, the Primary Certificate Examination (at the end of 1st year) and Final Certificate Examination (at the end of 2nd year). Each examination consists of three papers lasting three hours each, with 50% as the passing mark.

Table 32. Program Structure, Dental Hygienist Certificate, Dental Council of India[29]

Year	Subject	Hours		
		Lecture	Practicals, Demonstrations, Clinical	Total
1st (Primary)	Anatomy, General and Dental	50	100	150
	Physiology & Histology, General and Dental	20	40	60
	Materia Medicine, General & Dental	15	10	25
	Pathology & Bacteriology, General and Dental	30	70	100
	Dental Radiology.	10	40	50
	Food and Nutrition	30	40	70
	Dental Hygiene and Oral Prophylaxis	25	225	250
	English	--	--	65
	Office Assistance, Practice Management, Bookkeeping and Typing	30	100	130
	Subtotal			**900**
2nd (Final)	Dental Hygiene and Oral Prophylaxis	25	350	375
	(i) Dental Health Education (ii) Social & Public Health Dentistry (iii) Preventive Dentistry	50	200	250
	Operative Room Technique and Chair Side Assistance	10	200	210
	Dental Ethics and Jurisprudence, Orientation in Dentistry	15	--	15
	Dental Materials	10	10	20

	Subtotal			**870**

The Dental Council of India defines the Dental Mechanic as a person who makes or repairs dental appliances and dentures including inlay, crown and bridge work. The **Dental Mechanics Certificate** program lasts two years. Students must pass two major examinations, the Primary Certificate Examination (at the end of 1st year) and Final Certificate Examination (at the end of 2nd year). Each examination consists of two papers lasting three hours each, with 50% as the passing mark.

Table 33. Program Structure, Dental Mechanics Certificate, Dental Council of India[30]

Year	Subject	Hours		
		Lecture	Practicals, Demonstrations, Clinical	Total
1st (Primary)	Applied Physics & Mechanics	30	20	50
	Applied Chemistry	30	20	50
	Applied Oral Anatomy	20	90	110
	Dental Materials	20	40	60
	Dental Metallurgy	15	15	30
	Dental Mechanics (Primary)	30	600	630
	Subtotal	145	785	930
2nd (Final)	Dental Materials	10	10	20
	Dental Metallurgy	20	40	60
	Dental Mechanics (Final)	30	785	815
	Subtotal	60	835	895

Teacher Education

Overview

Modern teacher education began in India during the British rule, with the first training institute for elementary school teachers established in 1856. The Indian Education Commission of 1882 approved the introduction of separate courses for the training of elementary and secondary school teachers. Training colleges affiliated to universities were established to offer one-year programs such as Bachelor of Education (B.Ed), Bachelor of Training (BT), and Licentiate in Teaching (considered equivalent to B.Ed). Teacher education has expanded rapidly since Independence. The total number of school teachers grew from less than one million in 1950 to nearly six million in 2003 (2.1 million primary + 1.6 million upper primary + 2.0 million secondary and higher secondary school teachers).[31]

Administration

The National Council for Teacher Education (NCTE) was first established in 1973 as an advisory body to the central and state governments on teacher education. The National Policy on Education of 1986 (revised in 1992) stipulates that education of comparable standards should be made available throughout the country. Following the enactment of the *NCTE Act* of 1993, NCTE was granted statutory status in 1995, with powers to formulate regulations and norms for teacher education and recognize teacher education institutions. It has published curriculum frameworks for teacher education in 1978, 1988, 1998 and 2006 (draft).

The *NCTE Act* applies to all of India except the state of Jammu & Kashmir. Degrees in teacher education from Jammu & Kashmir are accepted for employment purposes by the central and state governments, while their recognition for the purpose of admission into higher academic programs is determined by the states or universities concerned.

The National Council of Educational Research and Training (NCERT) is an apex body that assists and advises central and state government on all matters relating to school education. Through its constituent units such as the National Institute of Education (NIE) and Regional Institutes of Education (RIEs), it also plays an important role in coordinating and promoting pre-service and in-service teacher education at all levels of school education as well as in vocational education, educational technology, guidance and counselling, and special education. State Councils/Directorates of Education Research and Training (SCERTs) play a similar role at the state level.

Types of Institutions

Teacher education is provided by university education departments, university-affiliated colleges, open universities, and dedicated elementary and secondary/higher secondary teacher education institutions.

There is a system of centrally sponsored teacher education institutions. Examples include:

- District Institutes of Education and Training (DIETs). Under the guidance of State Councils/Directorates of Educational Research and Training (SCERTs), they offer diploma programs in elementary teacher education.
- Institutes of Advanced Studies in Education (IASEs).
- National Institute of Education (NIE). As a constitute unit of the NCERT, the NIE in New Delhi conducts research on pedagogy, prepares curricular and supplementary materials, undertakes experiments at all stages of school education, and provides in-service training of educational administrators and teacher educators.
- Five Regional Institutes of Education (RIEs). Formerly known as Regional Colleges of Education (RCEs), the RIEs are also constituent units of the NCERT and affiliated to universities. They serve as regional resource centres for school education and teacher education, conducting research and offering innovative pre-service and in-service courses such as the four-year integrated BA B.Ed, B.Sc. B.Ed and B.Com B.Ed programs.

Teacher Certification

The state departments of education have jurisdiction over the granting of certificates/diplomas to elementary (Classes 1-8) teachers. The B.Ed. degree, required for teaching at secondary and higher secondary schools (Classes 9-12), is issued by universities. **There is no separate professional certification process for teachers**.

Only those who have obtained teaching certificates by studying at NCTE-recognized institutions are legally eligible for employment in government-supported schools. The NCTE website provides a list of recognized teacher education institutions.

For many years after Independence, teacher education programs in India varied from state to state in terms of structure, length of study, and entry requirements. In 2001 the NCTE published regulations on the minimum qualifications for the recruitment of school teachers, to be fully implemented within three years. The regulations apply to all formal schools established, run, aided or recognised by the central or state governments for imparting education at elementary, secondary and higher secondary stages.

Table 34. Minimum Qualifications for Recruitment of Teachers in Schools, NCTE, 2001[32]

Level		Minimum Academic and Professional Qualifications
Preschool/Nursery	Aged 4-6	Class 10 + Diploma/Certificate in Preschool Teacher Education program of at least one year's duration, or
		Class 12 + B.Ed (Nursery)
Preschool/Nursery followed by Classes 1-2	Aged 4-8	Class 12 with at least 45% marks + Diploma/Certificate in Nursing Teacher Education program of at least two years' duration, or
		Class 12 + B.Ed (Nursery)
Elementary (Primary + Upper Primary/Middle School)	Academic Subjects	Class 12 + Diploma/Certificate in Basic Teachers' Training of at least two years' duration, or
		Class 12 + Diploma/Certificate in Elementary Teachers' Training for at least two years, or
		Bachelor of Elementary Education (B.El.Ed), or
		Bachelor of Education (B.Ed) or equivalent.
	Physical Education	Class 12 + Certificate of Physical Education of at least two years' duration

Secondary (High School)	Academic Subjects	Bachelor of Education (B.Ed) or equivalent, or
		Four-year integrated B.Sc. B.Ed or equivalent.
	Physical Education	Postgraduate Bachelor of Physical Education (B.P.Ed) or equivalent.
Higher/Senior Secondary	Academic Subjects	Master's degree in relevant subject + B.Ed or equivalent, or
		Two-year integrated MSc. M.Ed or equivalent.
	Physical Education	Master of Physical Education (M.P.Ed)

Preschool/Nursery Teachers (Children Aged Four to Six)

Preschool/nursery education for children aged four to six is non-compulsory. Preschool/nursery teacher education trains teachers for teaching at preschool facilities such as nurseries, kindergartens, preparatory schools, and Early Child Care and Education (ECCE) centres. It is mostly provided by private institutions that do not receive government funds.

According to NCTE regulations, pre-service programs for teaching children aged four to six involve one year of fulltime study, including 150 days of instruction plus at least 30 days of internship, with entry based on the completion of secondary school (Class 10). However, early programs varied from state to state, lasting from less than a year to two years, with entry based on the completion of either Class 10 or Class 12.

Examples of exit credentials at the certificate/diploma level include:
- Pre-Primary Teaching Certificate
- Diploma in Preschool Education
- Diploma in Early Childhood Care and Education
- Nursery Teacher Training Certificate (preschool/nursery + Classes 1 & 2)

The Nursery Teacher Training Certificate allows one to teach children aged four to eight at nursery schools that integrate preschool education with the teaching of Classes 1 and 2 of the (lower) primary stage. According to NCTE regulations, the Nursery Teacher Training Certificate program involves two years of fulltime study, including 150 days of instruction per year plus at least 30 days of internship, with entry based on the completion of Class 12 with at least 45% marks.

Some institutions offer programs that combine preschool teacher education with (lower) primary teacher education. Such a program leads to a certificate/diploma, such as Diploma in Preschool and Lower Primary Education, which enables one to teach at both preschool and lower primary (Classes 1-5) levels.

Preschool/nursery teacher education at the university level is also available through the one-year postgraduate Bachelor of Education (B.Ed) with specialization in Nursery Teacher Education or Early Childhood Care and Education.

Teacher educators for certificate/diploma level preschool teacher education programs must have

- B.Ed, B.Ed (Nursery), Bachelor of Elementary Education (B.El.Ed.), or
- Diploma in Preschool and Lower Primary Education or Diploma in Elementary Education.

Elementary Teachers (Classes 1-8)

Elementary education, consisting of (lower) primary (Classes 1-5) and upper primary (Classes 6-8) levels, is compulsory. Elementary teacher education is offered by teacher training institutes, colleges of elementary teacher education, District Institutes of Education and Training (DIETs), universities, and private institutes.

According to NCTE regulations, pre-service certificate/diploma-level programs for elementary teachers involve two years of fulltime study, including 150 days of instruction each year plus at least 30 days of internship, with entry based on the completion of Class 12. Some states were allowed to operate programs of shorter duration and lower entry requirement (one year of fulltime study following the completion of Class 10) that had existed before the enactment of the *NCTE Act* in 1993 until the 2004-2005 academic year.

Examples of exit credentials issued for elementary teacher education programs at the certificate/diploma level include:

- Basic Teaching Certificate
- Primary Teaching Certificate
- Teacher Training Certificate
- Diploma in Teacher Education
- Diploma in Basic Education
- Diploma in Education (D.Ed)
- Diploma in Elementary (Teacher) Education

Please refer to Appendix 14 for a sample program structure for the Two-Year Diploma in Elementary Teacher Education.

Elementary teacher education at the university level is available through the one-year postgraduate Bachelor of Education (B.Ed) with specialization in elementary education or the newer four-year integrated **Bachelor of Elementary Education (B.El.Ed)**. Where the postgraduate B.Ed is offered through correspondence or other distance learning mode, the length of study is usually two years.

According to NCTE regulations, the integrated Bachelor of Elementary Education (B.El.Ed) involves four years of fulltime study, including 16 weeks of internship in the fourth year, following the completion of Class 12 with at least 50% marks. A sample program structure for the B.El.Ed is given in Appendix 15.

Teacher educators for certificate/diploma-level elementary teacher education programs must have

- M.Ed/MA (Education) with at least 55% marks (preferably with specialization in

elementary education), or

– Master's degree with at least 55% marks in relevant school subjects + Bachelor of Elementary Education (B.El.Ed) / B.Ed (preferably with specialization in elementary education) + five years experience teaching at recognized elementary schools.

Secondary and Higher Secondary Teachers (Classes 9-12)

Secondary and higher secondary teacher education is provided by universities and the five Regional Institutes of Education (RIEs). Teaching at secondary schools (Classes 9-10) requires a B.Ed in Secondary Education. Teaching at higher/senior secondary schools (Classes 11-12) requires a B.Ed in Secondary Education and a master's degree (MA, M.Com, M.Sc. or M.Ed).

The **Bachelor of Education (B.Ed)** can be earned either as a one-year postgraduate bachelor's degree, with entry based on the completion of a first bachelor's degree (BA, B.Sc. or B.Com) or as an integrated four-year course, with entry based on the completion of higher secondary school (Class 12). One may also obtain a B.Ed after completing the first year of a two-year Master of Education (M.Ed) program.

According to NCTE regulations, the postgraduate **B.Ed in Secondary Education** involves one year of fulltime study, including 150 days of instruction plus at least 30 days of internship, following the completion of a bachelor's or master's degree with at least 45% marks. Where the postgraduate B.Ed is offered through correspondence or other distance learning mode, the length of study is usually two years. Please refer to Appendix 16 for a sample program structure for the postgraduate B.Ed.

Institutions currently offer the same B.Ed program for training secondary and higher secondary teachers. The most recent Curriculum Framework for Teacher Education (2006) proposes separate curricula for secondary teacher education and higher secondary teacher education, which is further divided into the academic and vocational streams. NCTE also envisages increasing the duration of the postgraduate B.Ed. program from one year to two years of fulltime study.

The **Master of Education (M.Ed)** requires one year of fulltime study following the completion of a B.Ed, or two years of fulltime study following the completion of a BA, B.Sc., or B.Com. The completion of the first year of the two-year M.Ed program leads to the award of a postgraduate B.Ed.

According to NCTE regulations, the M.Ed program involves one year of fulltime study following the completion of the B.Ed. with at least 55% marks. There shall be at least 180 working days, including internship and four weeks of field visit for dissertation. Only university departments and institutions offering B.Ed programs are eligible to run the M.Ed program. Two-year part-time M.Ed programs for in-service teachers and educational administrators with at least two years of related work experience are also offered by some university departments and Institutes of Advanced Studies in Education

(IASEs). Please refer to Appendix 17 for a sample program structure for the M.Ed.

Physical Education

While pre-service education for teachers in specialized areas such as vocational education and special education come in the form of B.Ed specializations, such as B.Ed in Special Education, there are separate programs for training teachers of physical education.

According to NCTE regulations, teachers of physical education at the elementary stage are required to have a **Certificate of Physical Education (C.P.Ed)**. The C.P.Ed involves two years of fulltime study following the completion of higher secondary school with at least 45% marks. There should be 150 days of instruction each year plus at least 30 days of internship.

Teachers of physical education at the secondary stage are required to have a postgraduate **Bachelor of Physical Education (B.P.Ed)**. Physical education teachers at higher secondary schools must hold a Master of Physical Education (M.P.Ed) or equivalent.

The B.P.Ed involves at least one year of fulltime study, though the NCTE envisages increasing the duration to two years. Entry is based on one of the following:

- Three-year Bachelor of Physical Education (BPE)
- Bachelor's degree + having represented the state or university in sports/games/athletics
- Bachelor's degree + 1st, 2nd or 3rd position in inter-collegiate sports/games/tournaments or possessing National Cadet Corps C certificate or basic course in adventure sports
- Bachelor's degree + one-year training program in sports science, sports management, sports coaching, yoga, Olympic education, sports journalism, etc.

The Master of Physical Education (M.P.Ed) degree involves two years of fulltime study following the completion of a postgraduate B.P.Ed or three-year BPE with at least 50% marks.

Vocational and Technical Education

Trade Instructors

The Directorate General of Employment and Training (DGET) of the Ministry of Labour and Employment is responsible for training instructors for Industrial Training Institutes (ITIs) and for trade apprentices of the Apprenticeship Training Scheme. Training programs, including both a one-year course and short-term refreshers courses, are offered by the Advanced Training Institutes (ATIs) at Ludhiana, Calcutta, Hyderabad, Mumbai and Kanpur and Central Training Institute for Instructors at Chennai.

The one-year course for trade instructors provides training in both skill development and principles of teaching. Successful completion of the program leads to the **Instructor Training Certificate (I.T.C.)**. Entry is based on one of the following:

– Engineering diploma
– National Apprenticeship Certificate
– National Trade Certificate plus one year of related work experience

The ATI at Hyderabad and the Central Training institute for Instructors at Chennai offer the equivalent of the one-year course in three separate modules:
– Trade Technology (6 months)
– Trade Methodology – Principles of Teaching (3 months)
– Engineering Technology (3 months)

Polytechnic Instructors
Four Technical Teachers' Training Institutes (TTTIs) at Bhopal, Calcutta, Chandigarh and Madras were established in 1967 to promote polytechnic education. Currently known as **National Institutes of Technical Teachers' Training and Research (NITTTRs)**, they conduct a variety of pre-service ("induction") and in-service ("staff development") training programs for teachers of polytechnics and engineering colleges. They are also involved in educational research, development of curriculum and instructional materials, and promoting industry-school interaction. The degree programs offered by NITTTRs are university-affiliated and approved by AICTE.

The NITTTRs offer the 1.5-year (3-semester) **Master of Technical Education (M.Tech.Ed.),** recognized by AICTE as a desirable qualification for teaching and administrative posts at polytechnics. Entry requirements include a BE/B.Tech in First Class and three years of related work experience.

Examples of other long-term programs offered by the NITTTRs include:
– Diploma in Technical Teaching
– Bachelor of Technology (Education)
– Master of Technology (Education)
– Master of Technology (Human Resource Development)
– Master of Engineering (Education)
– PhD in Engineering Education (Interdisciplinary)

Please refer to Appendix 18 for a sample program structure for the Master of Engineering (Education).

Documentation

School Education

Table 35. Major Types of Secondary School Credentials

Credential	Issuing Body	Years of Study
All India Secondary School Certificate Delhi Secondary School Certificate Matriculation Examination	Central Board of Secondary Education (CBSE)	2 (following 8 years of elementary school)
Indian Certificate of Secondary Education	Council for the Indian School Certificate Examinations (CISCE)	
Secondary School Certificate	National Institute of Open Schooling (NIOS)	
Secondary School Certificate Secondary School Leaving Certificate High School Leaving Certificate Anglo-Indian High School Examination Certificate Matriculation Examination	State Boards of Secondary Education	

Table 36. Major Types of Higher Secondary School Credentials

Credential	Issuing Body	Years of Study
All India Senior School Certificate Delhi Senior School Certificate (All India) Higher Secondary Examination Part II	CBSE	2
Indian School Certificate	CISCE	
Senior Secondary Certificate	NIOS	
Higher Secondary (School) Certificate Intermediate Examination Pre-University Examination Pre-Degree Examination	State Boards of Higher Secondary Education Universities	

The 10+2 scheme indicated in the above tables (10 years of elementary and secondary education + 2 years of higher/senior secondary education), first introduced in the early 1970s, has been implemented in most of the country since the late 1980s. As school education has evolved largely at the state level, program structure and certificate name vary from state to state and over different time periods. Some older secondary certificates may represent 11 years of schooling, and some older higher secondary certificates may also represent 11 years of schooling.

Issuing Bodies

The state board or one of the three All India boards conducts the exit examination for secondary and higher secondary education and issues the certificates. Statements of examination results issued by schools are not acceptable for the purpose of assessment. In the past, universities often administered examinations and issued certificates, usually at the pre-university/higher secondary level.

All India Boards:

– Central Board of Secondary Education (CBSE)
– Council for the Indian School Certificate Examinations (CISCE)
– National Institute of Open Schooling (NIOS)

Names of the state boards vary and may have changed over time. Each state has either two separate boards for secondary and higher secondary education respectively or one board for both. Please refer to Appendix 1 for a list of recognized state school education boards provided by the Ministry of Human Resource Development, Government of India.

Document Format

Document format varies depending on the issuing body and time period.

– Documents are issued in Hindi, a regional language (e.g. Bengali, Punjabi, Tamil, etc.), English, Hindi and English, or a regional language and English.
– They should bear the insignia of the issuing board and the signature of the official in charge such as the Controller of Examinations or Secretary. They may be countersigned by the school principal.
– There are often two documents: certificate and marks sheet (also called marks statement, marks card, etc.).
– The reverse sides of the documents may contain additional information such as examination regulations and grading scale.

The certificate may include some or all of the following information:

– Issuing body
– Name and date of the examination
– Name of the candidate
– Name of the school
– Program studied (e.g. academic or vocational stream of higher secondary education)
– Group/stream of subjects (e.g. humanities, science, commerce)
– Subjects passed
– Total mark obtained and maximum total mark (e.g. 280 out of 450)
– Overall achievement in terms of division/grade/class

The marks sheet may include some of the above information but should provide details about individual subjects such as marks obtained (theory and practical), minimum pass marks and maximum marks.

Higher secondary documents usually include only the final marks sheet (Class 12) but sometimes include mark sheets for both years (Class 11 and Class 12).

Higher Education

Table 37. Major Types of Higher Education Credentials

Credential	Issuing Body	Years of Study
Pre-professional (e.g. medicine, engineering, architecture) certificate	Universities	1
Diploma in Engineering and Technology	State Boards of	3 (after

	Technical Education	Class 10)
Diploma	Universities and colleges	1-3
Bachelor's Degree (BA, B.Com & B.Sc.)	Universities	3
Bachelor of Education (postgraduate degree)	Universities	1
Bachelor of Education	Universities	4
Bachelor of Technology (B.Tech.), Bachelor of Engineering (BE), Bachelor of Science in Engineering (B.Sc. Engg.)	Universities	4
Bachelor of Nursing (B.Nurs.), Bachelor of Science in Nursing (B.Sc. Nursing)	Universities	4
Bachelor of Medicine and Bachelor of Surgery (MBBS/BMBS)	Universities	5.5
Bachelor of Law(s) (LLB or BL) (integrated degree)	University	5
Bachelor of Law(s) (LLB or BL) (postgraduate degree)	University	3
Master of Arts (MA), Master of Commerce (M.Com), Master of Science (M.Sc.)	University	2
Master of Education (M.Ed.)	University	1
Master of Engineering (ME), Master of Technology (M.Tech.)	University	2
Doctor of Medicine (M.D.), Master of Surgery (M.S.) (post MBBS/BMBS degrees)	University	3
Doctor of Medicine (D.M.), Master of Chirurgie (M.Ch.) (post M.D./M.S. degrees)	University	3
Master of Philosophy (M.Phil)	University	1-2
Doctor of Philosophy (Ph.D)	University	2-4

Administrative and Issuing Bodies

The Universities Grants Commission (UGC) website provides updated lists of universities. One can look up an institution by name, state, and type (central university, deemed university, institutes of national importance, state university, state legislature university, etc.). The UGC website also provides lists of recognized colleges, which numbered 6,014 as of Mar 31, 2006, as well as a list of autonomous colleges.

The Association of Indian Universities (AIU) provides a list of its member institutions on its website. It publishes the biannual *Indian Universities Handbook*, which lists recognized Indian universities and their programs. The AIU also publishes handbooks on special areas of education, providing university departments and colleges and detailed information about the programs they offer. Examples include *Handbook on Management Education, Handbook on Computer Education,* and *Handbook on Engineering Education*.

The All India Council for Technical Education (AICTE) approves institutions that offer technical education programs from diploma to postgraduate levels. Its website provides lists of approved institutions offering the following types of programs:

- Diploma in Engineering
- Bachelor of Engineering/Technology, Pharmacy, Architecture & Applied Arts, Hotel Management & Catering Technology
- MBA, Master of Computer Applications (MCA), Master of Pharmacy, Master of Engineering/Technology, Master of Architecture

– Postgraduate Diploma in Management (PGDM)

Educational programs in some specialized and professional areas are under the purview of relevant apex bodies and professional associations, which provide information about institutions offering recognized programs. Examples include the National Council for Teacher Education (NCTE), the Medical Council of India (MCI), and the Dental Council of India (DCI).

Document Format

Document format varies depending on the issuing body and time period.

– There are degree certificates and marks sheets (known as marks card, marks certificate, statement of marks, etc.).
– Documents are usually issued in English, English and Hindi, or English and a regional language (e.g. Bengali, Punjabi, Tamil, etc.). Sometimes they are issued only in Hindi or only in a regional language.
– They should bear the seal of the university and signatures of relevant officials such as Chancellor, Registrar, and Controller of Examinations.
– For some programs, students may receive only provisional degree certificates upon graduation, with the final certificates issued afterward.

Universities issue the degrees, regardless of whether the program is conducted by a university department or an affiliated college. If the program is conducted by an autonomous college, the name of the college also appears on the degree certificate.

Marks sheets are normally issued by universities. Marks sheets issued by autonomous colleges are also acceptable.

– There is typically one marks sheet for each year, e.g. Part I (1st year), Part II (2nd year) and Part III/Final (3rd year) for a completed three-year bachelor's degree, or Previous/Part I (1st year) and Final/Part II (2nd year) for a completed two-year master's degree. Occasionally a three-year bachelor's degree comes with only two marks sheets: Part I (semesters 1-3) and Part II/Final (semesters 4-6).
– Sometimes there is one marks sheet/transcript showing all years.
– Some programs in professional and specialized fields issue marks sheets by semesters.
– The marks sheets indicate the courses/papers completed, the marks obtained and sometimes the minimum pass marks.
– Marks sheets typically do not indicate the number of instructional hours for each subject; a university syllabus is required to obtain such information. The affiliated college that conducts the teaching may provide additional information such as specific hours of instruction for the courses.
– Universities that adopt the credit system (e.g. agricultural universities) indicate the number of credits of individual subjects on the marks sheets.

For technician-level education such as diplomas in engineering/technology, the state boards of technical education issue the mark sheets of annual examinations and the diplomas/certificates.

Grading Scale

Higher Secondary Education

The percentage system is predominantly used. The Indian system is low marking, and the minimum pass mark generally ranges between 30 and 35%. Grading scales adopted by the state boards and the three All India boards vary and may have changed over time. A common grading scale at the higher secondary level is given below:

Table 38. School Education Grading Scale

Mark (%)	Descriptor
60-100	First Class or First Division
50-59	Second Class or Second Division
35-49	Third Class, Third Division or Pass
<35	Fail

The Central Board of Secondary Education (CBSE) puts all the candidates who passed the Class 10 or Class 12 examination in a ranking order to award the grades. The top 0.1% of candidates will receive Merit Certificates. The minimum pass mark for each subject is 33%.

Table 39. CBSE Grading Scale[33]

Grade	Mark (%)	Description
A1	33-100	Top 1/8 of passed candidates
A2		Next 1/8 of passed candidates
B1		Next 1/8 of passed candidates
B2		Next 1/8 of passed candidates
C1		Next 1/8 of passed candidates
C2		Next 1/8 of passed candidates
D1		Next 1/8 of passed candidates
D2		Next 1/8 of passed candidates
E	<33	Fail

The Council for the Indian School Certificate Examinations (CISCE) adopts a nine-point scale. Grades 1-6 indicate “pass with credit”, with 1-2 as “very good”. Grades 7-8 indicate “pass”, and grade 9 “failure”. The minimum pass mark for each subject is 40%.

Table 40. CISCE Grading Scale[34]

Grade	Descriptor
1	Pass with Credit
2	
3	
4	
5	
6	
7	Pass
8	
9	Failure

Most bachelor's and master's degrees are classified into divisions or classes based on the marks students obtain in the major examinations at the end of each year or semester. Grading scale varies from institution to institution. The Indian system is low marking, with minimum pass mark generally ranging between 33 and 40%, though some institutions or programs adopt a 50% pass. Students who have failed in one or more subjects in a major examination but who have achieved institution-designated minimum marks (e.g. 25%) in the aggregate may be allowed to proceed with their study and make up the failed subjects at a subsequent examination.

Table 41. Grading Scale for B.Com (Pass), University of Delhi[35]

Division	Mark
First Division	60% or above
Second Division	50% or above
Third Division	36% or above

Table 42. Grading Scale for B.Sc. Nursing, Maharashtra University of Health Sciences, Nashik[36]

Class	Mark
First Class with Distinction	70% or above
First Class	60% or above
Second Class	50% or above
Fail	Below 50%

A number of institutions such as the Indian Institutes of Technology (IITs), the central and state agricultural universities, and Jawaharlal Nehru University adopt a 10-point system. The grading scale may vary from institution to institution. The points can be converted to letter grades and are sometimes divided into divisions or classes.

Table 43. Grading Scale, Indian Institute of Technology, Delhi[37]

Grade Point	Letter Grade	Description
10	A	Outstanding
9	A-	Excellent
8	B	Very Good
7	B-	Good
6	C	Average
5	C-	Below Average
4	D	Marginal
2	E	Poor
0	F	Very Poor

Table 44. Grading Scale, Jawaharlal Nehru University[38]

Letter Grade	Grade Point
A+	9
A	8
A-	7
B+	6
B	5
B-	4

C+	3
C	2
C-	1
F	Fail

A four-point scale was widely used among agricultural universities. Currently the Indian Council of Agricultural Research (ICAR) prescribes for all universities offering agricultural programs a 10-point grading system. Undergraduate programs require a minimum average grade point of 5.00 for passing a subject and overall grade point average of 5.50 for obtaining a degree. Master's and Ph.D programs require a minimum average grade point of 6.00 for passing a subject and overall grade point average of 6.50 for obtaining a degree.

Table 45. Grading Scale, Assam Agricultural University[39]

Mark (%)	Grade Point	
	Undergraduate	Postgraduate
100	10.00	10.00
99	9.90	9.90
98	9.80	9.80
97	9.70	9.70
96	9.60	9.60
60	6.00	6.00 (minimum pass)
50	5.00 (minimum pass)	

Notes on Sources

Websites

Government Bodies

All India Council for Technical Education (AICTE) (http://www.aicte.ernet.in)

Central Board of Secondary Education (CBSE) (http://cbse.nic.in)

Council for the Indian School Certificate Examinations (CISCE) (http://www.cisce.org)

Department of Agricultural Research and Education, Ministry of Agriculture, Government of India (http://dare.nic.in)

Directorate General of Employment & Training, Ministry of Labour and Employment, Government of India (DGET) (http://dget.nic.in)

Directory of Education Websites of Government of India (http://goidirectory.nic.in/education.htm)

DOEACC Society, Ministry of Communications & Information Technology, Government of India (https://www.doeacc.edu.in)

Ministry of Human Resource Development, Government of India (http://education.nic.in)

National Assessment and Accreditation Council (NAAC) (http://naacindia.org)

National Board of Accreditation (NBA) (http://www.nba-aicte.ernet.in)

National Council for Educational Research and Training (NCERT) (http://www.ncert.nic.in)

National Council for Teacher Education (http://www.ncte-in.org)

National Institute of Open Schooling (http://www.nos.org)

University Grants Commission (UGC) (http://www.ugc.ac.in)

Professional Bodies

All India Management Association (AIMA) (http://www.aima-ind.org)

Bar Council of India (http://barcouncilofindia.nic.in)

Central Council of Indian Medicine (http://www.ccimindia.org)

Dental Council of India (http://www.dciindia.org)

Indian Council of Agricultural Research (ICAR) (http://www.icar.org.in)

Indian Nursing Council (http://www.indiannursingcouncil.org)

Institute of Engineers (India) (http://www.ieindia.org/index.html)

Medical Council of India (http://www.mciindia.org)

Pharmacy Council of India (http://www.pci.nic.in)

Veterinary Council of India (http://www.vci.nic.in)

Other Resources

A Guide to Indian Education Resources on the Web (http://www.wes.org/ewenr/07jan/practical.htm)

Association of Indian Universities (http://www.aiuweb.org)

India Education.Net (http://www.indiaeducation.info)

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Appendices

Appendix 1. Samples of School Education Certificates, CBSE and the States of Punjab and Tamil Nadu

School education certificates in India have a great variety in terms of nomenclature, examining body, and the total years of schooling they represent. The following tables include a non-exhaustive sampling of the certificates issued by the Central Board of Secondary Education (CBSE) and two states, Punjab and Tamil Nadu. Please note that some of the certificate names are no longer in use, and the 11-year exit credentials have been discontinued. Some examinations, such as the Pre-University and Pre-Medical/Engineering Examinations, were administered by universities.

Table 46. Samples of School Education Certificates, CBSE

Stage	School Year	Certificate Name
Higher Secondary	12	All India Senior School Certificate; Delhi Senior School Certificate
	11	(All India) Higher Secondary Examination; Higher Secondary Examination – Part II
Secondary	10	Matriculation Examination; All India Secondary School Examination; Delhi Secondary School Examination
	9	

Table 47. Samples of School Education Certificates, Case Study of Punjab

Stage	School Year	Certificate Name
Higher Secondary	12	Senior Secondary Certificate Examination – Part II; Senior Secondary (Class XII) Examination; Intermediate Examination; Pre-Medical/Engineering Examination
	11	Higher Secondary Examination; Higher Secondary (Part II) Examination; Higher Secondary (Class XI) Examination; Senior Secondary Certificate Examination – Part I; Pre-University Examination
Secondary	10	Matriculation Examination; Matriculation (Class X) Examination; Secondary School Examination; Higher Secondary (Part I) Examination
	9	Matriculation (Class IX) Examination

Table 48. Samples of School Education Certificates, Case Study of Tamil Nadu

Stage	School Year	Certificate Name
Higher Secondary	12	Higher Secondary Course Certificate; Pre-University Examination
	11	Anglo-Indian High School Examination; Secondary School Leaving Certificate; Secondary School Leaving Certificate (elongated course); Matriculation Examination
Secondary	10	Anglo-Indian High School Examination; Anglo-Indian School Leaving Certificate Examination; Secondary School Leaving Certificate (new pattern); Matriculation Examination
	9	

Appendix 2. Recognized State Boards of School Education[40]

State	Board	Year of Establishment
Andhra Pradesh	(i) Andhra Pradesh Board of Secondary Education	1953
	(ii) Andhra Pradesh Board of Intermediate Education	1971
Assam	(i) Assam Board of Secondary Education	1962
	(ii) Assam Higher Secondary Education Council	1984
Bihar	(i) Bihar School Examination Board	1952
	(ii) Bihar Intermediate Education Council	1980
Goa	Goa Board of Secondary & Higher Secondary Education	1975
Gujarat	Gujarat Secondary Education Board	1960
Haryana	Haryana Board of Education	1969
Himachal Pradesh	Himachal Pradesh Board of School Education	1969
Jammu & Kashmir	J&K State Board of School Education	1965
Karnataka	(i) Karnataka Secondary Education Examination Board	1966
	(ii) Karnataka Board of the Pre-University Education	1970
Kerala	Kerala Board of Public Examinations	1949
Maharashtra	Maharashtra State Board of Secondary and Higher Secondary Education	1966
Madhya Pradesh	Madhya Pradesh Board of Secondary Education	1959
Manipur	(i) Manipur Board of Secondary Education	1972
	(ii) Manipur Council of Higher Secondary Education	1992
Meghalaya	Meghalaya Board of School Education	1973
Mizoram	Mizoram Board of School Education	1976
Nagaland	Nagaland Board of School Education	1974
Orissa	(i) Orissa Board of Secondary Education	1965
	(ii) Orissa Council of Higher Secondary Education	1955
Punjab	Punjab School Education Board	1969
Rajasthan	Rajasthan Board of Secondary Education	1957
Tamil Nadu	(i) Tamil Nadu Board of Secondary Education	1908
	(ii) Tamil Nadu Board of Higher Secondary Education	1982
Tripura	Tripura Board of Secondary Education	1973
U.P.	U.P. Board of High School & Intermediate Education	1922
West Bengal	(i) West Bengal Board of Secondary Education	1951 (Reconstituted in 1964)
	(ii) West Bengal Council of Higher Secondary Education	1929 (Reconstituted in 1962)

Appendix 3. Sample Program Structures, B.Com (Pass) and B.Com (Honours)

Table 49. Bachelor of Commerce (Pass), 2006-2007, University of Delhi[41]

Part	Paper		Lecture per Week	Maximum Marks
I	1	Business Organisation and Management	3	75
	2	Financial Accounting	3	75
	3	Business and Industrial Laws	3	75
	4	Economics Paper I – Principles of Economics	4	100
	5	Humanities Group – one of MIL (Modern Indian Languages)	4	100
	Subtotal		17	425
II	6	Business Mathematics and Statistics	3	75
	7	Corporate Accounting	3	75

	8	Company and Compensation Laws	3	75
	9	Income Tax and Auditing	3	75
	10	Economics Paper II – Macroeconomics	4	100
	11	Humanities Group - English	4	100
	Subtotal		20	500
III	12	Cost Accounting	3	75
	13	Computer Applications in Business	3	75
	14	Economics Paper III – Economics Development and Policy	4	100
	15	Humanities Group – Elective Paper	4	100
	16	Choose from Options (a) – (d) (a) Financial Management (b) Marketing Management (c) Human Resource Management (d) E-Commerce	3	75
	Subtotal		17	425
Grand Total			54	1350

Table 50. Bachelor of Commerce (Honours), 2005-2006, University of Delhi[42]

Part	Paper			Lecture per Week	Maximum Marks
I	1	Business Organisation & Management		3	75
	2	Financial Accounting		3	75
	3	Microeconomic Theory and Applications I		3	75
	4	Business Statistics		3	75
	5	Business Law		3	75
	6	Introduction to Computers and Information Systems		3	75
	7	(a) Business Communication (b) Politics, Ethics & Social Responsibility of Business		2 2	50 50
	Subtotal			22	550
II	8	Corporate Accounting		3	75
	9	Coast Accounting		3	75
	10	Microeconomic Theory and Applications II		3	75
	11	Business Mathematics		3	75
	12	Corporate Laws		3	75
	13	Income Tax Law and Practice		3	75
	14	(a) E-Commerce (b) Auditing		2 2	50 50
	15	English/Hindi/History/Mathematics/MIL Democracy and Governance in India/ Introduction to Philosophy		2	50
	Subtotal			24	600
III	16	Compulsory Integration Courses	Management Accounting	3	75
	17		Macroeconomics	3	75
	18		Indian Economy – Performance and Policies	3	75
	Choose two of the following elective groups (4 courses)				
		Group A: Finance I – Financial and Investment Management			
	19	Financial Management		3	75
	20	Fundamentals of Investment		3	75

		Group B: Finance II – Financial Institutions, Services & Insurance		
	21	Financial Markets, Institutions and Financial Services	3	75
	22	Insurance and Risk Management	3	75
		Group C: Marketing, Advertising and Personal Selling		
	23	Principles of Marketing	3	75
	25	Advertising and Personal Selling	3	75
		Group E: International Business and Globalisation		
	25	International Business	3	75
	26	Politics of Globalisation	3	75
		Group E: Human Resource Management		
	27	Human Resource Management	3	75
	28	Compensation Management	3	75
		Group F: Tax Planning and Management		
	29	Corporate Tax Planning	3	75
	30	Business Tax Procedures and Management	3	75
		Group G: Entrepreneurship & Small Business		
	31	Entrepreneurship Development	3	75
	32	Small Business Venturing and Management	3	75
		Group H: Enterprise Business Solutions		
	33	Computerized Accounting System	3	75
	34	Enterprise Resource Planning	3	75
		Group I: Business Data Processing		
	35	Business Data Processing I (Programme Development Tools)	3	75
	36	Business Data Processing II (Business Information System)	3	75
	37	Project Work		25
		Group J: Human Rights and Consumer Protection		
	38	Democracy & Human Rights	3	75
	39	Consumer Protection	3	75
		Group K: Agricultural Marketing & Rural Credit		
	40	Agricultural Marketing	3	75
	41	Rural Finance and Credit	3	75
	Subtotal		21	550
Grand Total			67	1700

Appendix 4. Sample Program Structure, M.Phil

Table 51. M.Phil in Statistics, University of Delhi, 1999-[43]

Duration: 1 Year	**Entry Requirement: First or Second High Class Master degree in Statistics**		
Part	**Duration**	**Content**	**Marks**
Part I (Courses)	Six months (Aug 1 – Jan 31)	Three of the following courses will be assigned to the student based on their preferences: (a) Stochastic Processes (b) Applied Probability Models (c) Design of Experiments (d) Design and Inference in Survey (e) Bayesian Inference (f) Order Statistics (g) Bio-Statistics (h) Multivariate Analysis	Course I: 100 Course II: 100 Course III: 100

		(i) Non-Parametric Methods (j) Reliability and Life Testing	
Part I (Dissertation)	Six months (Feb 1 – July 31)	The student will write a dissertation pertaining to one of the three courses completed in Part I.	Dissertation: 150 Viva Voce: 50
Total			500

Appendix 5. Sample Program Structure, B.E.

Table 52. Bachelor of Engineering (B.E.), Manufacturing Process and Automation Engineering, 2000-2001, University of Delhi[44]

Course Number	Course Name	Credit	Course Type
1st Semester			
101	Humanities	4	3-1-0
102	Mathematics I	4	3-1-0
103	Physics	4	3-1-0
104	Chemistry	4	3-1-0
105	Manufacturing Processes (Introduction)	4	3-0-0
106	Engineering Drawing	3	0-0-3
107	Physics Lab	2	0-0-2
108	Chemistry Lab	2	0-0-3
109	Workshop Practice	2	0-0-3
Subtotal		29	15-4-11
2nd Semester			
111	Electrical Sciences	4	3-1-0
112	Mathematics II	4	3-1-0
113	Mechanical Sciences	4	3-1-0
114	Science of Materials	4	3-0-0
115	Mechanics of Solids	4	3-1-0
116	Electrical Sciences Lab	2	0-0-2
117	Mechanical Sciences Lab	2	0-0-2
118	Introduction to Computer Lab	2	0-1-2
119	Mechanics of Solids Lab	2	0-0-2
120	Programming	1	0-0-2
Subtotal		29	15-5-10
3rd Semester			
201	Machine Drawing & Graphics	4	2-0-0
202	Manufacturing Processes I	4	3-1-0
203	Electro Mechanics	4	3-1-0
204	Analog and Digital Electronics	4	3-1-0
205	Technology and Society	4	3-1-0
206	Machine Drawing & Graphics Lab	2	0-0-4
207	Science of Materials & Manufacturing Processes I Lab	2	0-0-2
208	Electro Mechanics Lab	2	0-0-2
209	Analog and Digital Electronics Lab	2	0-0-2
210	Programming I	1	0-0-2
Subtotal		29	14-4-12
4th Semester			
211	Kinematics & Dynamics of Machinery	4	3-1-0
212	Control Systems	4	3-1-0
213	Mathematics III	4	3-1-0

214	Manufacturing Processes II	4	3-1-0
215	Management of Manufacturing Systems	4	3-1-0
216	Kinematics and Dynamics of Machinery Lab	2	0-0-2
217	Control Systems Lab	2	0-0-2
218	Manufacturing Processes II Lab	2	0-0-3
219	Practical Training	2	
220	Report Writing	1	0-0-1
221	Programming II	1	0-0-2
Subtotal		30	15-4-10
5th Semester			
301	Machine Tools, CNC & Automation	4	3-1-0
302	Transducers and Measurements	4	3-1-0
303	Tool Design	4	4-0-0
304	Industrial Control systems Or: Information system and Data management Or: Communication Principles and Circuits	4	3-1-0
305	Microprocessors and Applications	4	3-2-0
306	Machine Tools Lab	2	0-0-2
307	Tool Design Lab	2	0-0-2
308	304 based Lab	2	0-0-2
309	Transducers and Measurements Lab	2	0-0-2
310	Programming III	1	0-0-2
Subtotal		29	16-5-10
6th Semester			
311	Robotics and CAM I	4	3-1-0
312	Computer Graphics Or: Telemetry and Data Transmission	4	3-1-0
313	Applied Plasticity (Forming Processes)	4	3-1-0
314	Mechanical Design	4	3-1-0
315	Metrology & Statistical Quality Control	4	3-2-0
316	Robotics and CAM I Lab	2	0-0-2
317	312 based Lab	2	0-0-2
318	Forming Processes Lab	2	0-0-2
319	Mechanical Design Lab	2	0-0-2
320	Practical Training	1	
321	Programming IV (AUTOCAD)	1	0-0-2
Subtotal		30	15-6-10
7th Semester			
401	Introduction to CAD and Product Design	4	3-1-0
402	Modern Methods of Manufacturing	4	3-1-0
403	Industrial Electronics	4	3-1-0
404	Elective I	4	3-1-0
405	Elective II	4	3-1-0
406	CAD Lab	2	0-0-3
407	Modern Methods of Manufacturing Lab	2	0-0-3
408	Industrial Electronics Lab	2	0-0-2
409	Practical Training	2	
410	Programming V (AUTOCAD)	1	0-0-2
Subtotal		29	15-5-10
8th Semester			
411	Macaronis Or: Artificial Intelligence	4	3-1-0

412	Elective III	4	3-1-0
413	Elective IV	4	3-1-0
414	411 based Lab	2	0-0-3
415	Elective III and IV Lab	2	0-0-3
416	Project	8	0-0-10
417	Practical Training	2	
418	Seminar and Reports	1	0-0-1
Subtotal		27	9-3-17
Total		232	

Notes:

1. Course type (L-T-P) refers to the number of hours per week for the lecture, tutorial and practical components.
2. Courses are classified into groups such as humanities and sciences (H), allied engineering (A), and departmental core (C). Students may be awarded the B.E. degree after earning a minimum of 220 credits, provided they have not failed more than four credits in any of the above-mentioned course groups. Students may register in courses of up to a maximum of 240 credits.
3. Major examinations are conducted at the end of each semester. For most courses, the end of semester examination accounts for 70% of evaluation, with the mid-term test, assignments, etc. making up the remaining 30%.

Appendix 6. Sample Program Structure, B.Sc. Agriculture

Table 53. B.Sc. Agriculture, Tamil Nadu Agricultural University, 2003-2004[45]

Course No.	Course Name	Credit (Theory + Practical)
Semester I		
AGR.101	Principles of Agronomy	2+1
AGR.102	Agricultural Heritage of India	1+0
SAC.101	Fundamentals of Soil Science	2+1
HOR.111	Fundamentals of Horticulture	1+1
PBG.101	Fundamentals of Crop Botany	1+1
AEX.101	Rural Sociology and Educational Psychology	1+1
MAT.111	Mathematics for Agricultural Sciences	0+1
ENG.111	English for Science and Technology	0+1
NSS/NCC.111	National Service Scheme/National Cadet Corps	0+1
PED.111	Physical Education	0+1
COM.111	Introduction to Computer Technology	0+1
Subtotal		8+10=18
Semester II		
AGR.103	Fundamentals of Agricultural Meteorology	1+1
AMP.101	Fundamentals of Livestock and Poultry Production	2+1
AEN.101	Fundamentals of Entomology	1+1
PAT.101	Fundamentals of Plant Pathology	2+1
BIC.101	Fundamentals of Biochemistry	2+1
SAC.102	Introduction to Agricultural Chemistry	2+1
AGM.101	Fundamentals of Microbiology	1+1
AEC.101	Principles of Economics	1+0
Subtotal		12+7=19
Semester III		
AGR.201	Principles of Weed Science, Irrigation & Dry Farming Management	2+1

PBG.201	Genetics and Cytogenetics	2+1
AEN.201	Applied Entomology	2+1
PAT.201	Applied Plant Pathology	1+1
CRP.201	Principles of Crop Physiology	2+1
FMP.211	Farm Machinery and Power	1+1
SWC.211	Soil and Water Conservation Engineering	1+1
AGR.202	Crop Production	0+1
TAM.201	Language for Communication / ENG.201 (Non Tamil Students)	0+1
Subtotal		11+9=20
Semester IV		
AGR.202	Crop Production	Contd.
AGR.203	Agronomy of Field crops – I	2+1
HOR.211	Production Technology of Fruits, Spices and Plantation Crops	2+1
STA.211	Agricultural Statistics	1+1
PBG.202	Methods of Plant Breeding	1+1
ANM.201	Agricultural Nematology	1+1
SER.201	Sericulture Technology	0+1
ENS.201	Environmental Science and Agroecology	2+1
FMP.212	Operation and Maintenance of Tractor and Implements	0+1
AEC.201	Farm Management Economics	1+1
FOR.211	Social Forestry and Agro forestry	1+1
Subtotal		11+10=21
Semester V		
AEC.301	Agricultural Marketing and International Trade	1+1
AGR.301	Agronomy of Field Crops – II	1+1
SAC.301	Soil Resource Inventory and Fertility	2+1
HOR.311	Production Technology of Vegetables	1+1
AEN.301	Pest Management in Crops	2+1
AGM.301	Soil and Applied Microbiology	1+1
PAT.301	Disease Management in Crops	2+1
ABT.301	Agricultural Biotechnology	2+1
PBG.301	Breeding Field Crops	1+1
Subtotal		13+9=22
Semester VI		
SST.301	Seed Production and Quality Control	2+1
HOR.312	Commercial Flowers and Medicinal Plants	1+1
PIT.311	Communication and Information Technology	2+1
AEX.301	Agricultural Extension Education and Rural Development	1+1
FSN.301	Food Preservation and Post Harvest Technology (Dept. of Agricultural Processing and Food Science and Nutrition)	2+1
ARM.301	Agri. Business Management	1+1
Subtotal		9+6=15
	Cafeteria Courses	-
		Not exceeding 25
Semester VII		
AEX.401	RAWE (Village stay, Internship at line Department, NGOS) - 60 Days	0+6
ARM.401	Agro-Industrial tie-up – 17 Days	0+1
AGR.401	Agri Study Tour - 28 Days	0+2
Subtotal		0+9=9
Semester VIII		

ARM.402	Entrepreneurship Development	2+1
PIT.411	Agro Informatics	2+1
Subtotal		4+2=6
	Cafeteria Courses	-
		Not exceeding 25
Total		130 + 20 (cafeteria courses)

Notes:
1. Cafeteria courses, newly introduced in 2003-2004, refer to technology-oriented courses with commercial applications. Students may select 7-8 courses in the 6th and 8th semesters, worth about 13 percent of the course load. Examples include "Organic Agriculture", "Mushroom Technology", "Industrial Microbiology", and "Agricultural Banking and Project Analysis".
2. RAWE: Rural agricultural work experience.

Appendix 7. Three-Year Bachelor of Law(s) (LLB/BL) Program Structure, Bar Council of India (BCI)[46]

I. 21 Compulsory Courses
1. Jurisprudence.
2. Contract-I(General Principle of Contract-Section 1-75 and Specific Relief)
3. Contract-II (Indian Contract Act, Indian Partnership Act, Sale of Goods Act and other Specific contracts).
4. Tort and Consumer Protection Laws.
5. Family Law-I
6. Family Law-II
7. Law of Crimes
8. Criminal Procedure Code, Juvenile Justice Act and Probation of Offenders Act.
9. Constitutional Law
10. Property Law including Transfer of Property Act and Easement Act.
11. Law of Evidence
12. Civil Procedure Code and Limitation Act.
13. Legal Language/Legal Writing including General English
14. Administrative Law
15. Company Law
16. Human Rights and International Law
17. Arbitration, Conciliation and Alternate Dispute Resolution Systems
18. Environmental Law including laws for the protection of the wild life and other living creatures including animal welfare.
19. Labour Law.
20. Interpretation of Statutes
21. Land Laws including ceiling and any other local laws.

II. No less than three subjects chosen from the following:
1. International Economic Law.
2. Bankruptcy Laws
3. Taxation Laws
4. Comparative Law/Legal History
5. Insurance Law
6. Conflict of Laws
7. Banking law including Negotiable Instruments Act
8. Investment and Security Law
9. Trusts, Equity and Fiduciary Relationships
10. Criminology and Penology

11. Air and space Law
12. Law and Medicine
13. Women and Law and Law Relating to Child/Law, Poverty and Development
14. Intellectual Property Law
15. Maritime Law

III. Six months of practical training including the following compulsory papers:

1. Moot Court, Pre-Trail Preparations and Participation in Trial proceedings.
2. Drafting, Pleading and Conveyancing.
3. Professional Ethics, Accountancy for Lawyers and Bar Bench Relations.
4. Public Interest Lawyering, Legal Aid and Para Legal Services.

Appendix 8. Sample Program Structure, B.Sc. Nursing

Table 54. B.Sc. Nursing, Maharashtra University of Health Sciences, Nashik[47]

No.	Course Name		Hours		
			Theory	**Practical**	**Clinical**
First Year					
1	Anatomy		80	20	
2	Physiology		65	10	
3	Biochemistry		40		
4	Foundations of Nursing		76	154	300
5	Normal Nutrition and Food Preparation		45	15	
6	Introduction to Community Health including Family Welfare		75		45
7	Psychology		75	15	
8	English/Marathi/Hindi		75		
Subtotal			531	214	345
Second Year					
1	Microbiology		60	5	
2	Medical-Surgical Nursing I	Medicine and Medical Nursing	150	45	800
		Surgery and Surgical Nursing	120	15	
3	Sociology		60		
4	English		50		
Subtotal			440	65	800
Third Year					
1	Paediatric Nursing		120		240
2	Medical-Surgical Nursing II		120		450
3	Psychiatric Nursing		75		240
4	Community Health Nursing I		75		105
5	Economics		50		
Subtotal			440		1035
Fourth Year					
1	Gynaecological Nursing and Midwifery		90	20	450
2	Community Health Nursing II		60		450
3	Principles of Nursing Service, Communication and Education		85		
4	Professional Nursing including Nursing Research		55		
Subtotal			290	20	900
Total			1701	299	3080

Appendix 9. List of 32 Institutions Whose Postgraduate Diploma in Management Has Been Equated with MBA Degree by AIU[48]

1. Amity Business School, Noida (UP)

2. Amrita Institute of Management, Coimbatore
3. Centre for Management Development, Modinagar (UP)
4. Fore School of Business Management, New Delhi
5. Graduate School of Business Administration, Noida (UP)
6. Indian Institutes of Management, Ahmedabad
7. Indian Institutes of Management, Lucknow
8. Indian Institutes of Management, Indore
9. Indian Institutes of Management, Bangalore
10. Indian Institutes of Management, Kolkata
11. Indian Institutes of Management, Kozhikode
12. Indian Institute of Health Management, Jaipur
13. Institute of Public Enterprise, Hyderabad
14. Institute of Management Technology, Ghaziabad
15. Institute of Technology & Science, Mohan Ngr, Ghaziabad
16. Institute for Integrated Learning in Management (IILM), N. Delhi
17. Indian Institute of Forest Management, Bhopal
18. Institute of Rural Management, Anand
19. Institute of Finance and International Management, Bangalore
20. Institute of Management Studies, Ghaziabad
21. International Management Institute, New Delhi
22. Jagan Institute of Management Studies, Delhi
23. Loyala Institute of Business Administration, Chennai
24. Management Development Institute, Gurgaon
25. Narsee Monjee Institute of Management Studies, Mumbai
26. NIILM Centre for Management Studies, New Delhi
27. School of Communication & Management Studies, Cochin
28. S P Jain Institute of Management & Research, Mumbai
29. T A Pai Management Institute, Manipal
30. Vaikunth Mehta National Institute of Cooperative Mgt, Pune
31. Xavier Institute of Management, Bhubaneswar
32. Xavier Labour Relations Institute, Jamshedpur

Appendix 10. List of Engineering and Non-Engineering Trades under the Craftsmen Training Scheme[49]

Table 55. Engineering Trades: Manufacturing Sector

Sl. No.	Name of the Trade	Duration	Entry Qualification
1.	Foundry Man	1 year	Passed Class 8th examination under 10+2 system of education or its equivalent.
2.	Sheet Metal Worker	1 year	Passed 8th Class examination under 10+2 system of education or its equivalent.
3.	Plastic Processing Operator	1 year	Passed 10th Class examination under 10+2 system of education or its equivalent.
4.	Painter General	2 years	Passed 8th Class examination or its equivalent.
5.	Fitter	2 years	Passed 10th Class examination under 10+2 system of education or its equivalent.
6.	Turner	2 years	Passed 10th Class examination under 10+2 system of education or its equivalent.
7.	Machinist	2 years	Passed 10th Class examination under 10+2 system of education or its equivalent.
8.	Tool & Die Maker (Press Tools, Jigs & Fixtures)	3 years	Passed 10th Class examination under 10+2 system of education with Science or its equivalent.
9.	Tool & Die Maker (Dies &	3 years	Passed 10th Class examination under 10+2

	Moulds)		system of education with Science or its equivalent.
10.	Machinist (Grinder)	2 years	Passed 10th Class examination under 10+2 system of education or its equivalent.
11.	Electroplater	2 years	Passed 10th Class examination under 10+2 system of education or its equivalent.
12.	Mechanic Agricultural Machinery	2 years	I. Essential: Should have passed 8th Class examination under 10+2 System of education or its equivalent. II. Desirable: Passed 10th Class Examination under 10+2 system of education with Science (Physics and Chemistry) as one of the subjects.
13.	Instrument Mechanic	2 years	Passed 10th Class examination under 10+2 system of education with Science as one of the subjects or its equivalent.
14.	Draughtsman (Mechanical)	2 years	Passed 10th Class examination under 10+2 system of education with Science and Mathematics or its equivalent.
15.	Maintenance Mechanic (Chemical Plant)	2 years	Passed 10th Class examination with Physics, Chemistry and Mathematics under 10+2 system of education or its equivalent.
16.	Instrument Mechanic (Chemical Plant)	(a) 2 years (b) 6 months	Passed 10th Class examination under 10+2 system of education with Physics, Chemistry & Mathematics as one of the subjects or its equivalent. Passed B.Sc. with Physics & Chemistry.
17.	Attendant Operator (Chemical Plant)	(a) 2 years (b) 6 months	Passed 10th Class examination under 10+2 system of education with Physics, Chemistry & Mathematics as one of the subjects or its equivalent. Passed B.Sc. with Physics & Chemistry.
18.	Laboratory Assistant (Chemical Plant)	(a) 2 years (b) 6 months	Passed 10th Class examination under 10+2 system of education with Physics, Chemistry and Mathematics as one of the subjects or its equivalent. Passed B.Sc. with Physics and Chemistry.
19.	Information Technology & Electronics System Maintenance	2 years	Passed in 10th Class Examination under 10+2 system of education with minimum 60% marks in Mathematics & Science put together. Desirable: 12th Class with Mathematics and Physics.
20.	Mechanic Industrial Electronics	2 years	Passed 12th Class Examination with Physics, Chemistry & Mathematics.
21.	Mechanic Mechatronics	2 years	Passed 10+2 Class Examination with Physics, Chemistry & Mathematics.
22.	Operator Advanced Machine Tools	2 years	Passed 12th Class Examination with Physics, Chemistry & Mathematics.

Table 56. Engineering Trades: Service Sector

Sl. No.	Name of the Trade	Duration	Entry Qualification
23.	Welder (Gas and Electric)	1 year	Passed 8th Class examination under 10+2 system of education or its equivalent.

24	Upholster	1 year	Passed 8th Class examination under 10+2 system of education or two Classes below matriculation examination or equivalent.
25.	Carpenter	1 year	Passed 8th Class examination under 10+2 system of education with science as one of the subjects or its equivalent.
26.	Mechanic (Diesel)	1 year	Passed 10th Class examination under 10+2 system or its equivalent.
27.	Plumber	1 year	Passed 8th Class examination under 10+2 system of education or its equivalent.
28.	Mason (Building Constructor)	1 year	Passed 8th Class examination under 10+2 system of education or its equivalent.
29.	Mechanic (Tractor)	1 year	1) Essential: Should have passed 8th Class examination under 10+2 system of education or its equivalent. 2) Desirable: Passed 10th Class examination under 10+2 system of education with Science (Physics and Chemistry) as one of the subjects or its equivalent.
30.	Pump Operator-cum-Mechanic	1 year	Passed 10th Class examination under 10+2 system of education with Science or its equivalent.
31.	Wireman	2 years	Passed 8th Class examination or its equivalent.
32.	Mechanic (Motor Vehicle)	2 years	Passed 10th Class examination under 10+2 system of education or its equivalent.
33.	Mechanic (Watch & Clock)	2 years	Passed 10th Class examination under 10+2 system of education or its equivalent.
34.	Electrician	2 years	Passed 10th Class examination under 10+2 system of education or its equivalent.
35.	Mechanic (Radio & TV)	2 years	Passed 10th Class examination under 10+2 system of education or its equivalent.
36.	Mechanic-cum-Operator Electronics Communication System	2 years	Passed 10th Class examination under 10+2 system of education or its equivalent.
37.	Mechanic (Refrigeration and Air-Conditioner)	2 years	Passed 10th Class examination under 10+2 system of education with Science & Mathematics or its equivalent.
38.	Millwright / Maintenance Mechanic	2 years	Matriculation with Science and Mathematics or its equivalent.
38*	Mechanic Machine Tools Maintenance	3 years	Matriculation with Science and Mathematics or its equivalent.
39.	Draughtsman (Civil)	2 years	Passed 10th Class examination under 10+2 system of education with Science and Mathematics or its equivalent.
40.	Surveyor	2 years	Passed 10th Class examination under 10+2 system of education with Science and Mathematics or its equivalent.
41.	Electronic Mechanic	2 years	Passed Matriculation examination under 10+2 system of education Science and Mathematics or its equivalent.
42.	Building Maintenance	6 months	Passed 10th Class examination under 10+2 system of education or its equivalent.

43.	Mechanic Auto Electrical and Electronics	6 months	Passed 10th Class examination under 10+2 system of education with Science and Mathematics or its equivalent.
44.	Sanitary Hardware fitter	6 months	Passed 8th Class examination under 10+2 system of education or its equivalent.
45.	Lift Mechanic	2 years	Passed 10th Class examination under 10+2 system of education with Science or its equivalent.
46.	Architectural Assistant	1 year	Passed 10th Class examination with 40% marks in Mathematics or Secondary Standard under 10+2 system of education or its equivalent.
47.	Mechanic Computer Hardware	2 years	Passed 10+2 or Intermediate or Pre-university with Physics as one of the subjects.
48.	Mechanic Medical Electronics	2 years	Passed 10th Class examination under 10+2 system of education with Mathematics & Science or its equivalent.
49.	Mechanic Consumer Electronics	2 years	Passed 10th Class examination under 10+2 system of education with Mathematics & Science or its equivalent.

Table 57. Non-Engineering Trades: Manufacturing Sector

Sl. No.	Name of the Trade	Duration	Entry Qualification
1.	Embroidery and Needle Work	1 year	Passed 8th Class or its equivalent.
2.	Cane Willow and Bamboo Work	1 year	Passed 8th Class or its equivalent.
3.	Weaving of Silk and Woollen Fabrics	1 year	Passed 8th Class or its equivalent.
4.	Weaving of Woollen Fabrics	1 year	Passed 8th Class or its equivalent.
5.	Manufacture of Footwear	1 year	Passed 8th Class examination under 10+2 system of education or its equivalent.
6.	Leather Goods Maker	1 year	Passed 8th Class examination under 10+2 system of education or two Classes below Matriculation examination or its equivalent.
7.	Dress Making	1 year	Passed Matriculation examination or its equivalent or 10th Class under 10+2 system.
8.	Baker and Confectioner	1 year	Passed 10th Class examination under 10 + 2 system of education or its equivalent.

Table 58. Non-Engineering Trades: Service Sector

Sl. No.	Name of the Trade	Duration	Entry Qualification
9.	Desk Top Publishing Operator	1 year	a) Passed 12th under 10+2 system or its equivalent. b) Typing speed of 30 wpm in English. Desirable: typing speed of 30 wpm in Regional Language.
10.	Computer Operator and Programming Assistant	1 year	12th Class pass under 10+2 system or duly recognized Diploma in Engineering from any Polytechnic of 3 years duration after

			10th Class.
11.	Cutting & Sewing	1 year	Passed 8th Class or its equivalent.
12	Preservation of Fruits and Vegetables	1 year	Passed 10th Class examination under 10 + 2 system of education with Science or its equivalent.
13.	Photographer	1 year	Passed 10th Class examination with Physics and Chemistry under 10+2 system or its equivalent.
14.	Bleaching Dyeing and Calico Printing	1 year	Passed 10th Class examination under 10+2 system of education with Science and Mathematics or its equivalent.
15.	Stenography (English)	1 year	12th Class Pass
16.	Secretarial Practice	1 year	12th Class Pass
17.	Stenography (Hindi)	1 year	12th Class Pass
18	Hair and Skin Care	1 year	Passed Matriculation examination with Hygiene and Physiology or Biology as Elective Subject or 10th Class under 10+2 system with Hygiene and Physiology or Biology as Elective Subject or equivalent.
19	Steward	1 year	Passed 10th Class exam under 10+2 system of education or its equivalent.
20.	Craftsman Food Production (General)	1 year	Passed 10th Class exam under 10+2 system of education or its equivalent.
21.	Craftsman Food Production (Vegetarian)	1 year	Passed 10th Class exam under 10+2 system of education or its equivalent.
22.	Process Cameraman	1 year	Passed 10th Class exam under 10+2 system of Education with Science as one of the subjects or its equivalent.
23.	Plate Maker-cum-Impositor	1 year	Passed 10th Class exam under 10+2 system of education with Science as one of the subjects or its equivalent.
24.	Litho – Offset Machine Minder	1 year	Passed 10th Class exam under 10+2 system of education with Science as one of the subjects or its equivalent.
25.	Driver Cum Mechanic (Light Motor Vehicle)	6 months	Passed 10th Class examination under 10+2 system of education.
26.	Data Entry Operator	6 months	Essential: (i) 10th Class Passed (ii) Typing speed of 30 w.p.m. in English Desirable: Typing speed of 30 w.p.m. in Hindi/ Any Local language.
27.	Tourist Guide	6 months	Passed 12th Class under 10+2 system of education or equivalent.
28.	Floriculture & Landscaping	6 months	Passed 12th Class Examination with Biology as major subject or Vocational Training in Agro-Horticulture.
29.	Health Sanitary Inspector	1 year	Passed 12th Class Examination under 10+2 System of Education with Science in 10th Class. Preference given to trainees with Physics, Chemistry & Biology in 12th Class.
30.	Hospital House Keeping	1 year	Passed 12th Class examination under 10+2 System of Education with Physics, Chemistry & Biology.

31.	Dental Laboratory Technician	2 years	Passed 10th Class examination under 10+2 system of education.
32.	Medical Transcription	6 months	Passed 12th Class Examination under 10+2 system of education with Biology/Physiology as major subject. Knowledge of English Language is essential.
33.	Horticulture	1 year	Passed 12th Class Examination with Biology as major subject or Vocational Training in Agro-Horticulture.
34.	Library & Information Science	6 months	Passed 12th Class under 10+2 system of education or equivalent.
35.	Insurance	3 months	Passed 12th Class under 10+2 system of education or equivalent.
36.	Institution House Keeping	6 months	Passed 10th Class Examination under 10+2 System of Education.
37.	Corporate House Keeping	6 months	Passed 10th Class Examination under 10+2 System of Education.
38.	Domestic House Keeping	6 months	Passed 10th Class Examination under 10+2 System of Education
39.	Old Age Care	6 months	Passed 8th Class under 10+2 system of Education.
40.	Network Technician	6 months	Passed 12th Class under 10+2 system of education or equivalent.
41.	Pre/Preparatory School Management (Assistant)	6 months	Passed 10th Class Examination under 10+2 System of Education
42.	Creche Management	6 months	Passed 10th Class Examination under 10+2 System of Education
43.	Cabin/Room Attendant	6 months	i) Passed 10th Class Examination under 10+2 System of Education. ii) Working knowledge of English & Hindi.
44.	Dairying	1 year	Passed 10th Class Examination under 10+2 System of Education
45.	Digital Photographer	1 year	Passed 12th Class under 10+2 system of education or equivalent.
46.	Event Management Assistant	6 months	Passed 10th Class Examination under 10+2 System of Education or its equivalent. (with English as subject)
47.	Fashion Technology	1 year	Passed 12th Class under 10+2 system of education or equivalent.
48.	Front Office Assistant	6 months	Passed 10+2 Class Examination under 10+2 System of Education or its equivalent. (with English as subject)
49.	Interior Decoration and Designing	1 year	Passed 10th Class Examination under 10+2 System of Education

Appendix 11. Sample Program Structures, Diploma in Civil Engineering

Table 59. Three-Year Diploma in Civil Engineering, Carmel Polytechnic College, State of Kerala[50]

Year	Course
1st	English
	Tech. Maths
	Applied Science
	Engineering Graphics
	Computer Fundamentals & Programming in C
	Surveying
	Applied Science (Lab)
	Workshop Practice
	Surveying Lab
2nd	Mechanics of Solids
	Hydraulics
	Transportation Engineering & Urban Planning
	Surveying - II
	Building Science & Technology
	Soil Mechanics & Foundation Engineering
	Civil Engineering Drawing
	Surveying Practical II
	Survey Camp & Viva Voce
	Construction Practice Lab
	Computer Aided Drafting Lab
	Hydraulics Lab
3rd	Design of Structures
	Theory of Structures
	Irrigation Engineering
	Environment Engineering
	Construction Management & Entrepreneurship
	Quantity Surveying & Valuation
	Civil Engineering Drawing
	Material Testing Lab
	Environmental Engineering Lab
	Seminar, Project Work & Viva Voce
	Computer Application in Civil Engineering Lab

Table 60. Three-Year Diploma in Civil Engineering, Punjab State Board of Technical Education and Industrial Training[51]

Semester	No.	Course	Hours/Week
1st	1	Communication Skills I	4
	2	Applied Mathematics I	4
	3	Applied Physics I	6
	4	Applied Chemistry I	6
	5	Engineering Drawing I	8
	6	Workshop Practice	8
	7	Student Centered Activities	4
	Subtotal		40
2nd	1	Communication Skills II	4
	2	Applied Mathematics II	4

	3	Applied Physics II	6
	4	Applied Chemistry II	6
	5	Engineering Drawing II	8
	6	Workshop Practice II	8
	7	Student Centered Activities	4
	Subtotal		40
3rd	1	Information Technology	6
	2	Applied Mechanics	5
	3	Construction Materials	6
	4	Building Construction	8
	5	Hydraulics	6
	6	Civil Engineering Drawing I	5
	7	Student Centered Activities	4
			40
4th	1	Concrete Technology II	6
	2	Structural Mechanics	5
	3	Surveying I	9
	4	Irrigation Engineering	4
	5	Water Supply and Wastewater Engineering	6
	6	Civil Engineering Drawing II	6
	7	Student Centered Activities	4
	Subtotal		40
5th	1	Elements of RCC Design	4
	2	Transportation Engineering	7
	3	Soil & Foundation Engineering	6
	4	Surveying II & Camp	8
	5	Civil Engineering Drawing III	6
	6	Minor Project Work	5
	7	Student Centered Activities	4
	Subtotal		40
6th	1	Elements of Steel Structural Design	4
	2	Estimating & Costing	5
	3	Construction Management and Accounts	5
	4	Civil Engineering Drawing IV	6
	5	Computer Applications II	6
	6	Major Project Work	10
	7	Student Centered Activities	4
	Subtotal		40

Appendix 12. Sample Program Structure, Diploma in Modern Office Practice

Table 61. Three-Year Diploma in Modern Office Practice, Punjab State Board of Technical Education and Industrial Training

Semester	No.	Course	Hours/Week
1st	1	English & Communication Skills I	5
	2	Business Correspondence I	5
	3	Office Methods and Practices I	5
	4	Computer Applications I	8
	5	Typing (English) I	8
	6	Principles of Management I	5
	7	Student Centered Activities	4
	Subtotal		40

2nd	1	English & Communication Skills II	5
	2	Business Correspondence II	5
	3	Office Methods and Practices II	5
	4	Computer Applications II	8
	5	Typing (English) II	8
	6	Principles of Management II	5
	7	Student Centered Activities	4
	Subtotal		40
3rd	1	English & Communication Skills III	4
	2	Business Correspondence III	5
	3	Computer Applications III	7
	4	Stenography (English) I	10
	5	Bookkeeping and Accountancy I	5
	6	Personality and Human Relations Development	5
	7	Student Centered Activities	4
			40
4th	1	English & Communication Skills IV	4
	2	Computer Applications IV	7
	3	Stenography (English) II	10
	4	Handling of Office Machines & Equipments I	5
	5	Bookkeeping and Accountancy II	5
	6	Personality and Human Relations Development	5
	7	Student Centered Activities	4
	Subtotal		40
5th	1	Computer Applications V	7
	2	Stenography (English) III	10
	3	Handling of Office Machines & Equipments II	6
	4	Business Organization & Law	4
	5	Elective (Typing Hindi or Punjabi or Electronic)	5
	6	Entrepreneurship & Business Environment	4
	7	Student Centered Activities	4
	Subtotal		40
6th	1	Industrial/Professional Training	40
	Subtotal		40

Appendix 13. Sample Program Structures, Diploma in Computer Engineering and Diploma in Computer Applications

Table 62. Three-Year Diploma in Computer Engineering, Punjab State Board of Technical Education and Industrial Training

Semester	No.	Course	Hours/Week
1st	1	Communication Skills I	4
	2	Applied Mathematics I	4
	3	Engineering Physics I	6
	4	Fundamentals of Information Technology I	6
	5	Engineering Drawing I	8

	6	Workshop Practice	8
	7	Student Centered Activities	4
	Subtotal		40
2nd	1	Communication Skills II	4
	2	Applied Mathematics II	4
	3	Basic Electrical Engineering I	7
	4	Basic Electronics I	7
	5	Fundamentals of Information Technology II	6
	6	Workshop Practice II	8
	7	Student Centered Activities	4
	Subtotal		40
3rd	1	Programming in C Language	9
	2	Digital Electronics	7
	3	Computer Architecture	4
	4	Operating System	6
	5	Computer Workshop I	6
	6	Applied Mathematics III	4
	7	Student Centered Activities	4
	Subtotal		40
4th	1	Object Oriented Programming	8
	2	Data Structure	6
	3	Database Management System	6
	4	System Analysis & Design	3
	5	Microprocessors	7
	6	Minor Project Work	6
	7	Student Centered Activities	4
	Subtotal		40
5th	1	Industrial Management	5
	2	Programming in FoxPro	7
	3	Computer Peripherals & Interfacings	6
	4	Computer Networks	6
	5	Computer Graphics	6
	6	Computer Workshop II	6
	7	Student Centered Activities	4
	Subtotal		40
6th	1	PC Organization	6
	2	Installation & Maintenance of Computers	6
	3	Fault Diagnosis	6
	4	Elective Subject	6
	5	Major Project Work	12
	6	Student Centered Activities	4
	Subtotal		40

Table 63. Diploma in Computer Applications, Dr. C.V. Raman University of Science, Technology, Commerce and Management[52]

Duration: 1 Year	**Entry Requirement: Class 12**
No.	**Paper**
Part I: Theory	
I	Fundamentals of Computers & Information Technology
II	Application Programming in FoxPro
III	P.C. Packages (Windows 95/98, MS-Word, MS-Excel)

IV	GUI Programming in Visual Basic
V	Desk Top Publishing
VI	Internet and Web Page Designing
Part II: Practical Training Program and Assignments	
I	Practical and Assignments
II	Viva-Voce

Appendix 14. Sample Program Structure, Diploma in Elementary Teacher Education

Table 64. Diploma in Elementary Teacher Education, Directorate of Educational Research and Training, State of Meghalaya[53]

Duration: 2 years		**Entry Requirement: Class 12**
Year	**No.**	**Course**
1st	1.	English
	2.	Mother Tongue (Khasi/Garo).
	3.	Social Studies
	4.	Science
	5.	Art of Healthy Living
	6.	Child Development
	7.	Mathematics
	8.	Principles of Education
	9.	School Experience Program
	10.	Projects and Assignments
	11.	Co-curricular Activities
2nd	1.	English
	2.	Mother Tongue (Khasi/Garo)
	3.	Social Science
	4.	Science
	5.	Art of Healthy Living
	6.	Mathematics
	7.	Principles of Education
	8.	Educational Technology
	9.	Planning & Management
	10.	Educational Psychology
	11.	Elementary Education in Meghalaya
	12.	Projects and Assignment
	13.	School Experience Program
	14.	Co-curricular Activities

Appendix 15. Sample Program Structure, Bachelor of Elementary Education (B.El.Ed)

Table 65. Bachelor of Elementary Education (B.El.Ed), University of Delhi[54]

Duration: 4 Years		**Entry Requirement: Class 12 with 50% in all Subjects; Women Only**	
Year	**Category**	**No.**	**Course**
1st	Theory	1	Child Development
		2	Contemporary India
		3	Nature of Language
		4	Core Mathematics

		5	Core Natural Sciences
		6	Core Social Sciences
	Practicum	1	Performing & Fine Arts
		2	Craft, Participatory Work
	Colloquia Enrichment	1	Colloquia & Tutorials
		2	Academic Enrichment Activities
2nd	Theory	1	Cognition & Learning
		2	Language Acquisition
		3	Human Relations & Communications
		4	Language across the Curriculum
	Liberal Course (Optional I)	1	English I
		2	Hindi I
		3	Mathematics I
		4	Physics I
		5	Chemistry I
		6	Biology I
		7	History I
		8	Political Science I
		9	Geography I
		10	Economics I
	Practicum	1	Observing Children
		2	Self-development Workshop
		3	Physical Education
	Colloquia Enrichment	1	Colloquia & Tutorials
		2	Academic Enrichment Activities
3rd	Theory	1	Basic Concept in Education
		2	School Planning & Management
		3	Logico-mathematics Education
		4	Pedagogy of Environmental Studies
	Liberal Course (Optional II)	1	English II
		2	Hindi II
		3	Mathematics II
		4	Physics II
		5	Chemistry II
		6	Biology II
		7	History II
		8	Political Science II
		9	Geography II
		10	Economics II
	Practicum	1	Classroom Management
		2	Material Development & Evaluation
	Colloquia Enrichment	1	Colloquia & Tutorials
		2	Academic Enrichment Activities
4th	Theory	1	Curriculum Studies
		2	Gender & Schooling
	Optional Course A: Pedagogy (choose one)	1	Language
		2	Mathematics
		3	Natural Science
		4	Social Science
	Optional Course B (choose one)	1	Computer Education
		2	Special Education

	Practicum	1	School Internship
	Colloquia Enrichment	1	Colloquia & Tutorials
		2	Project Work
		3	Academic Enrichment Activities

Appendix 16. Sample Program Structure, Bachelor of Education (B.Ed)

Table 66. Bachelor of Education (B.Ed) in Secondary Education, 2003-2004, Andhra Pradesh State Council of Higher Education[55]

Duration: 1 Year	**Entry Requirement: Bachelor/master's degree with at least 45% marks**		
Category	**No.**	**Paper**	**Instructional Hours**
Theory Paper	1	Foundations of Education	77.1
	2	Psychological Foundations of Education	77.1
	3	Educational Technology and Computer Education	77.1
	4	School Management and Systems of Education	77.1
	5	Personality Development and Communicative English	77.1
	6	Methods of Teaching I	77.1
	7	Methods of Teaching II	77.1
	Subtotal		540
Practical Paper	8	Practical Examination in Methods of Teaching I	
	9	Practical Examination in Methods of Teaching II	
	10	Practical Examination in Computer Education	
Special Projects	11	Community Studies Project (Practicum of Paper 1)	30
	12	Cultural Studies Project (Practicum of Paper 1)	30
	13	Case Studies Project (Practicum of Paper 2)	18
	14	Health and Physical Education Project (Practicum of Paper 2)	24
	15	Computer Education Project (Practicum of Paper 3)	48
	16	School Studies Project (Practicum of Paper 4)	18
	17	Personality Development and Communicative English Project (Practicum of Paper 5)	36
	Subtotal		204
Methods Records	18	Scholastic Achievement Record – Method I	12
	19	Scholastic Achievement Record – Method II	12
	20	Microteaching Record – Method I	30
	21	Microteaching Record – Method II	30
	22	Teaching Practice cum Internship Record Method I	180
	23	Teaching Practice cum Internship Record Method II	
	24	Teaching Practice cum Internship Diary	
	Subtotal		264
Others		I. Demonstration Lessons in Microteaching	12
		II. Demonstration Lessons in Macroteaching	18
		III. Allotment of Mentors and Topics for Practical Records	24
		IV. School Visit by Student Teachers to Select Topics for Teaching Practice	12
		V. Orientation Programs for School Teachers on Teaching Practice cum Internship to be Organized at College Level	6
	Subtotal		72
Grand Total			1080

Appendix 17. Sample Program Structure, Master of Education (M.Ed)

Table 67. Master of Education (M.Ed.), Osmania University[56]

Duration: 1 Year		**Entry Requirement: B.Ed with 55% marks + university-administered entrance examination**	
Category	**Course No.**	**Course**	**Hours per Week**
Semester I			
Common Papers	ED 101	Philosophical Foundations of Education	6
	ED 102	Advanced Educational Psychology I	6
	ED 103	Curriculum Development	6
	ED 104	Research in Education	6
	ED 105	Economics of Education	6
Elective Papers (choose one)	ED 106	Special Education	6
	ED 107	Alternative Education	6
	ED 108	Environmental Education	6
	ED 109	Value Education & Human Rights Education	6
Semester II			
Common Papers	ED 201	Sociological Foundation of Education	6
	ED 202	Advanced Educational Psychology II	6
	ED 203	Educational Management Planning and Finance	6
	ED 204	Emerging Technologies of Education	6
	ED 205	Educational Statistics	6
Elective Papers (choose one)	ED 206	Guidance and Counselling	6
	ED 207	Population Education	6
	ED 208	Disaster Management	6
	ED 209	Yoga Education	6
Dissertation			6

Appendix 18. Sample Program Structure, Master of Engineering (Education)

Table 68. Master of Engineering (Education) (M.E.Ed.), National Institute of Technical Teachers' Training and Research, Chennai[57]

Duration: 2 Years		**Entry Requirement: BE or B.Tech**
Semester	**Course No.**	**Course Name**
1st	521	Principles of Learning and Psychological Foundations of Education
	522	Engineering Curriculum Evaluation, Design and Instructional Materials Development
	523	Instructional Design and Microteaching
	524	Educational Communication
	525	Measurements and Evaluation in Technical Education
	526	Technical Education Planning
2nd	531	Technical Education Management
	532	Information Technology
	533	Technical Education Research
	534	Multimedia Production
	Electives (Choose two)	
	535	Technical Teacher Education
	536	Innovation in Technical Education

	537	Advanced Educational Theory and Practices
	538	Technical Student Services
	539	Non-formal Education for Unorganized Sector
3rd & 4th	541	Dissertation

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