CHAPTER III

UNIVERSITY OF KERALA AND ITS SCIENCE

DEPARTMENTS: An overview

3.0 Introduction

Education is a silent reformer and an instrument for social change. To get educated is the birthright of a human being, whether a man or woman. Teaching is the art of communicating truth. This process of communication is both theoretical and practical, but the theoretical is prior. The skill of the teacher lies in eliciting the interests of the child in the right things, especially in grasping the truth for its own sake.

The present day World is marked by a population explosion, the imperative requirements of economic development and the fight against hunger, the scientific and technological revolution, the multiplication of knowledge, the rise of the masses, the consequences and new expressions of democratic idea, the extension and proliferation of information and communication media. The World is making and will make many new demands on education.

The Universities are organizations engaged in the advancement of knowledge. They teach, train, and examine students in a variety of scholarly scientific and professional fields. Intellectual pursuits in
Universities are defined as the highest levels of competence in these fields. The universities provide opportunities both for members of their teaching staff and students to do original research in different areas. There is variation from country to country in the subjects included in the university education. The functions performed by universities in a particular country are related to their position in the total educational system of that country.²

The university is a community of scholars and students engaged in the task of seeking truth. It has its central concern for individual excellence, social justice, and knowledge generation. Universities are expected to provide higher levels of inputs to students who are supposed to be mature to analyse and synthesize, and are capable of performing at the abstract level of human learning. Students of these levels of education have adequately developed creative faculties and are ready to enter the more advanced phases of learning.

The University is the corporate realization of man's basic determination to know. Its most immediate aim is to discover what there is to be known and what becomes of us through knowledge. This eagerness to know experiences itself through observation, through methodological thought, and through self-criticism as a training for objectivity. It is active even where we confront the very limits of all knowledge and the special risks and tensions inherent in any intellectual quest.

The Oxford English Dictionary³ defines University as "The whole body of teachers and scholars engaged, at a particular place, in giving and
receiving instruction in the higher branches of learning, such persons associated together as a society or corporate body, with definite organization and acknowledged powers and privileges (especially that of conferring degrees), and forming an institution for the promotion of education in the higher or more important branches of learning, also the colleges, buildings, etc; belong to such a body.

The University, is an institution that uniting people professionally dedicated to the quest and transmission of truth in scientific terms. Because truth is accessible to systematic search, research is the foremost concern of the University. Because the scope of truth is far greater than that of science, the scientist must dedicate himself to truth as a human being, not just a specialist. Hence the pursuit of truth at the university demands, the serious commitment of the whole man. The university's second concern is teaching, because truth must also be transmitted.

The direct contribution, which the universities make to national life is by supplying the nation with leaders of thought and action in the social and political spheres. They are therefore, rightly described as the ‘nurseries’ of leaders. Besides moulding character and creating a right sense of values, university education teaches one to think for oneself, arrive at independent decision and communicate one’s thoughts effectively to others, all of which are qualities that go to make a leader.

From the definitions and statements it is clear that the Universities are primarily concerned with two major functions. One is extending the frontiers of knowledge through research at the higher level and the second...
one is passing on that knowledge to succeeding generations through teaching. These responsible and noble function put them at the apex of a formal system of education.

3.1 Objectives of the University

The university is dedicated to the pursuit of science and scholarship. Research and teaching contribute to knowledge as a way in which truth becomes meaningful and manifest. The task of the University may therefore be distinguished into three functions of research viz. the transmission of learning, education and culture. Each of these when considered in isolation is clearly inseparable.

In order to achieve the objectives of the University successfully, there must be communication of thinking man. Scholars must communicate with one another, teachers with their students and the students among themselves. Communication of all with all is necessary—each according to their intellectual level. We shall have to take up the meaning of this communication, the forms it may take and its freedom. Here is the living core of university life.

The University achieves its objectives within the framework of an institution. This framework is basic its very existence and is reflected in its procedural and administrative practices. The institution is simultaneously indispensable and a standing threat to the idea of the University. By definition knowledge aims at unification. Isolated disciplines may come and go. Within the cosmos of learning they nonetheless seek one another.
The university is articulated in such a way as to represent the unity of knowledge.\(^6\)

"If the University serves science and scholarship and if science and scholarship are meaningful only insofar as they are part of a comprehensive intellectual life, then this intellectual life is the very life blood of the University"\(^6\)

Traditionally, Universities are entrusted with four basic functions

1. Teaching, which is orderly transmission of the sum total of knowledge a society possesses to its younger generation through various structured courses of studies.

2. Research, which is the pursuit of new frontiers of knowledge in whatever directions and to whatever extent possible.

3. Preservation of the culture and ethos of the society, and

4. Extension work whereby the University serves the people at large\(^7\)

In modern World, higher education is expected to provide competent leadership in every field of activity whereas the primary and middle level education is expected to provide enlightened people to work for the state and society in different walks of life.

The constitution of India is committed to provide free and compulsory education to all children up to 14 year of age and the dead line for covering the entire population was 1961.\(^8\)

After the world war II higher education has greatly expanded in Asia. In Japan, which has one of the highest student- population ratios in
the world, expansion has led to the founding of many new universities of different types and the adoption of a pattern of studies modeled on the diversified American curriculum. The influence of the American pattern has also been considerable in India. Though there is an increase in the number of universities in Asia, the facilities were very poor. The problem of useless training in most severe in India and Indonesia where, following European and local traditions, higher education is still regarded as a means of access to the privileged classes rather than as training for productive work. Although similar traditions existed in pre-Revolutionary china, they have been counteracted by the adoption of the soviet system, in which students are assigned fields of study according to manpower plans.

In France even though the rate of growth has been high, most of this growth has occurred in the United Arabs Republic. South Africa also has a large concentration of students, most of whom are white. The rapid growth has created problems of intellectual underemployment similar to those of Asia. Development in South Africa has been relatively slow, during the period of the beginning of the second half of the 20th century.

3.2 Development of Universities in India

India is one of the most ancient seats of human civilizations. The tradition of intellectual activity was nurtured from the vedic times. Our subcontinent with its hoary past has had the privilege of having on its soil the famous seats of learning such as at Taxila, Nalanda, Vikramshila, Nagarjunakond, Mithila, Varanasi and Vallabhi.
It is often said that a phenomenal expansion has taken place in the field of higher education in the post independence years. The number of universities, colleges and enrolled students has risen alarmingly. This increase is often described as explosion and believed that we have cropped the problems, which are arising in the domain of higher education.

The development of Universities in India, as we understood today, is only 145 years old. The year 1857, a landmark in the history of education in India, saw the birth of the first three Universities, Calcutta, Bombay and Madras. Like London University on which they were modeled, they were purely examining and affiliating bodies and undertook no teaching and research. The actual teaching was done in the colleges but the syllabi were laid down by the University and examinations also conducted by it. Punjab University, Lahore is the fourth University established in the undivided India, which is now in Pakistan. In the divided India, the University of Allahabad is the fourth University having been established by a special Act in 1887. The Punjab University and University of Allahabad followed the same pattern. Actually the Indian Universities were instruments for strengthening British cultural intellectual and political dominations and European learning was accomplished through the administrative structure, the curriculum, the language of instruction and the personal contact between students and teachers.

As a result of a resolution on educational policy passed by Government of India in 1913; Universities were established in quick succession. The Benaras Hindu University was born in 1916, to be
followed by Mysore in the same year. The other Universities that came up in this series were, Patna (1917), Osmania in Hyderabad (1918) and the Aligargh Muslim University in 1920. Two more Universities were established during the same year in Lucknow University, Lucknow (1920) and University of Dacca (1920).

Before 1947 (January) nine more Universities were established including University of Delhi (1922) and University of Travancore (1937). During the period, January 1857 to January 1947, twenty-one Universities, as shown in the table 3.1 were established.
### Table 3.1 Universities established in the pre-independence Period

<table>
<thead>
<tr>
<th>Sl.No.</th>
<th>Name of the University</th>
<th>Year of Establishment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>University of Calcutta, Calcutta</td>
<td>1857</td>
</tr>
<tr>
<td>2.</td>
<td>University of Bombay, Bombay</td>
<td>1857</td>
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<tr>
<td>3.</td>
<td>University of Madras, Madras</td>
<td>1857</td>
</tr>
<tr>
<td>4.</td>
<td>Punjab University Lahore(now named as Lahore University)</td>
<td>1882</td>
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<tr>
<td>5.</td>
<td>University of Allahabad</td>
<td>1887</td>
</tr>
<tr>
<td>6.</td>
<td>Banaras Hindu University, Varanasi</td>
<td>1916</td>
</tr>
<tr>
<td>7.</td>
<td>Mysore University, Mysore</td>
<td>1916</td>
</tr>
<tr>
<td>8.</td>
<td>Patna University, Patna</td>
<td>1917</td>
</tr>
<tr>
<td>9.</td>
<td>Osmania University, Hyderabad</td>
<td>1918</td>
</tr>
<tr>
<td>10.</td>
<td>Aligarh Muslim University, Aligarh</td>
<td>1920</td>
</tr>
<tr>
<td>11.</td>
<td>Lucknow university, Lucknow</td>
<td>1920</td>
</tr>
<tr>
<td>12.</td>
<td>University of Decca</td>
<td>1920</td>
</tr>
<tr>
<td>13.</td>
<td>University of Delhi, Delhi</td>
<td>1922</td>
</tr>
<tr>
<td>14.</td>
<td>University of Nagpur, Nagpur</td>
<td>1923</td>
</tr>
<tr>
<td>15.</td>
<td>Andhra University, Waltair</td>
<td>1926</td>
</tr>
<tr>
<td>16.</td>
<td>University of Agra, Agra</td>
<td>1927</td>
</tr>
<tr>
<td>17.</td>
<td>Annamal University, Annamalai Nagar</td>
<td>1929</td>
</tr>
<tr>
<td>18.</td>
<td>University of Kerala, Kerala</td>
<td>1937</td>
</tr>
<tr>
<td>19.</td>
<td>Utkal University, Bhubanewswar</td>
<td>1943</td>
</tr>
<tr>
<td>20.</td>
<td>University of Saugar, Saugar</td>
<td>1946</td>
</tr>
<tr>
<td>21.</td>
<td>University of Rajasthan, Jaipur</td>
<td>1947</td>
</tr>
</tbody>
</table>
At present there are 248 University level institutions in India (including 42 deemed universities). Of these, 161 are traditional universities (including institutions for specialized studies in disciplines) while the others are professional/technical institutions. Thirty four Universities provide education in agriculture (including forestry, dairy, fisheries and veterinary science) 18 in medicine and 25 in engineering and technology, and 10 open Universities specialized institutions include Sanskrit Universities (7) Women’s Universities (5) population sciences (1) Regional languages (7) law (4) and Music and fine arts, statistics and journalism (one each). 13

It is no exaggeration to state that the alumni of the above universities have been responsible for all the impulses to progress in the country during the last few decades. As centers for research and learning they have to get more facilities for better performance in the future.

Developing and managing quality education in the most effective manner has been an important agenda in India since the publication of the kothari commission report (1964-66). To build quality higher education to cope up with international standards are now strong programme of action in India. UGC, NAAC and statutory specialized agencies have been instituted and actively engaged in enhancing and maintaining quality higher education in India.
3.3 Higher Education in Kerala

Higher education occupies the apex of the entire educational structure. It is well recognized that it promotes social and economic development by building human technological capabilities of society. It provides manpower for production, planning, management, and technological development, scientific inventions, which affect every important activity of every member of humanity from village to national and international levels. Technological and social change are major component of development. Higher education has an important role to play in facilitating these changes by helping to integrate advanced training and research. Higher education has its central concern for individual excellence, social justice and knowledge generation. Thus the society expects high yield especially with regards to the realization of its need and aspirations in the context of social changes, economic situations, political conditions etc. The societal expectations from higher education and its concern for the process of advanced phases of human learning make higher education, an integral part of national development. This reminds teachers of higher education about their greater responsibilities.

Higher education in Kerala has a long history with the starting of the Maharaja’s free school in 1834. Liberal patronage by the native rulers and active efforts of the missionaries and various other agencies helped the spread of education in the early stages. Moreover the generous support of the successive governments accelerated the rate of progress and today the state can boast of a larger number of institutions of learning than many
other states. Even during the pre-independent period the literacy rate of the erst-while Travancore state was very high compared to other states.

Education is economically as well as socially a productive investment. It is believed that education is an investment for the future vastly increasing the potential for future economic growth is no doubt valid. The social benefits from such investments have been truly remarkable. The progressive movements in the state and the evolution of enlightened public opinion are no doubt results of the spread of education.

Now there is a tremendous increase in the number of students as well as colleges and institutions. Kerala is one of the few states in India where the community shouldered the responsibility of conducting colleges and educational institutions without depending on government alone.

3.4 Universities in Kerala

At present there are seven universities functioning in Kerala. The first one started with the generous help of his highness maharaja during 1937, named as Travancore University, subsequently changed the name as University of Kerala and considered it as Mother University in Kerala. Since then six more universities were established in Kerala. The latest one is Kannur University established in 1995.
<table>
<thead>
<tr>
<th>Sl.No.</th>
<th>Name of University</th>
<th>Year of establishment</th>
</tr>
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<tbody>
<tr>
<td>1.</td>
<td>University of Kerala</td>
<td>1937</td>
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<td>2.</td>
<td>University of Calicut</td>
<td>1968</td>
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<tr>
<td>3.</td>
<td>Cochin University of Science and Technology</td>
<td>1971</td>
</tr>
<tr>
<td>4.</td>
<td>Kerala Agricultural University</td>
<td>1972</td>
</tr>
<tr>
<td>5.</td>
<td>Mahatma Gandhi University</td>
<td>1983</td>
</tr>
<tr>
<td>6.</td>
<td>Sree sankara University</td>
<td>1993</td>
</tr>
<tr>
<td>7.</td>
<td>Kannur University</td>
<td>1995</td>
</tr>
</tbody>
</table>

### 3.4.1 University of Calicut

The University of Calicut was established by an ordinance No. 5/68. Through an extra ordinary Gazette dated July 23, 1969 the establishment of the university was notified. The legislative assembly passed the Calicut University Act on August 26, 1968, which was repeated by the Calicut University Act (Act 50 of 1975). The objective of the University is to effect a reorganization of the system of education in the state to develop technical, technological education and research in applied science in addition to promoting Kerala art and culture. The University has 23 Departments of postgraduate study and research and 104 affiliated colleges.
3.4.2 Cochin University of Science and Technology

The University of Cochin was established as a federal university at Cochin by the University Act 1971 (Act 30 of 1971) for development of higher education with particular emphasis on post graduate studies and research in applied science, technology, industry and commerce. The university of Cochin has been reorganized and converted into a full fledged science and technological University, namely 'The Cochin University of Science and technology' of a unitary type for promotion of post graduate studies and advanced research in applied science, technology, industry & management by the Cochin University of Science and Technology Act 1986.

3.4.3. Kerala Agricultural University

Kerala Agricultural University was established by an ordinance, which was ratified by the Kerala Agricultural University (Act 33) in Sept.1971. The University was formally inaugurated in Feb, 1972. Head quarter of the University is located at Vellanikkara in Thrissur Dist. There are two campuses one at Mannuthy and other at Vellayani. There are 26 research stations and 8 constituent colleges. The jurisdiction of the University extends over the entire state.

3.4.4 Mahatma Gandhi University

Gandhiji University renamed as Mahatma Gandhi University came into existence on Oct. 2, 1983 by an ordinance issued by the Governor of Kerala. The ordinance was passed into an Act by the Kerala legislature in
April 1985. The University is located at Athirampuzha about 10 Km. Northwest of the Kottayam Town. The University has 26 teaching departments; three study centers and ninety-one affiliated colleges including two homeo colleges, one medical college, one Ayurveda college two Engineering colleges, one Law College and fifteen Teacher Training Colleges. The university offers Post Graduate and research degrees/ facilities in school of Gandhian studies and peace science, School of international Relations, School of pure and applied physics, school of Chemical Science, School of Medical Education, School of Letters, School of behavioral Science/ Bio-sciences, School of Computer Science and School of Social Sciences.

3.4.5 Sree Sankaracharya University of Sanskrit

Sree Sankaracarya University of Sanskrit was established by an act of Legislature of the Govt. of Kerala in November 1993 (Act 5 of 1994) at Kalady, for the promotion and development of the study of Sanskrit, Indology, Indian Philosophy and Indian languages and to conduct indepth research in the above subjects.

The Headquarters of the University is at the heart of Kalady, the birth place of Jagadguru Sri Adi Sankara. The territorial jurisdiction of the University is confined to the whole of Kerala. Apart from the Headquarters, the University has Regional Centres mainly in the rural areas of the districts like TVM, Panmana (Kollam) Ettumanoor (Kottayam) Thuravoor (Alappuzha), Elappully (Palakkad), Tirur (Malappuram) Koyilandy (Kozhikode), Payyannur (Kannur), Thiruvalla (PTA) and Trissur.
3.4.6. Kannur University

The University by the name ‘Malabar University’ came into existence by the promulgation of an ordinance (Malabar University Ordinance 1995) by the Governor of Kerala on the 9th day of November 1995.

The assembly enacted the Kannur University Act, 1996 with the change of the name of the University as Kannur University.

Kannur University is a multi Campus University. The main objective of the University is to effect a reorganization of the system of education and to provide study and research facilities in Science and Technology and for starting innovative and job oriented courses in such Campuses. Institute of Life Science, Centre for International studies, Centre for Information Science and Technology, Department of Mass communication and Journalism, Centre for Tribal studies are some of the important Departments/centers proposed to be started immediately at various Campuses.

3.4.7 University of Kerala

Formation of the University of Travancore, the predecessor of the present University of Kerala is an important landmark in the cultural history of Kerala. The University of Travancore was established and incorporated under Travancore University Act 1 of 1113 ME (1937-38) issued as Royal proclamation by his Highness Sri Balarama Varma Maharaja of Travancore on the auspicious occasion of his 27th birthday, on 1st
November 1937. The Act was framed broadly on the basis of the principles and proposals set forth in the memorandum.

His highness the Maharaja was pleased to be the chancellor of the University; he nominated Her Highness Setu Parvati Bhayi, D Litt; Maharani of Travancore as the pro-Chancellor. Sachivothama Sir. C P Ramaswami Aiyar, KCIE, Dewan of Travancore was appointed Vice Chancellor by His highness, and as he was to hold the office in addition to his duties as Dewan, a ProVice-Chancellor was also appointed. Sri. C. V. Chandrasekharan MA (Oxon), special University Officer, assumed charge of this office. Sri. A. Gopalamenon, M. A, Bcom (Lond), was appointed as Registrar.

The preamble of the Travancore University Act, 1937 stated the following objectives.

1. The gradual development of technical and technological education.

2. The furtherance of original research in the various branches of applied sciences.

3. The conservation and promotion of Kerala Art and Culture.

The University, which in 1938-39 had ten affiliated colleges with student strength of 3137, soon began to grow steadily in size. In 1957, the University was reconstituted in to a teaching and federal University with jurisdiction over the entire state. The University of Kerala thus came into being based on the Kerala University Act of 1957. The Preamble of the 1957 Act states that the aims of the
University as “to provide for the conservation, promotion and development of Kerala art and culture and the Malayalam language and for the gradual change of the medium of instruction into Malayalam in all the educational institutions of the state and to provide greater facilities for post graduate study and original research in all branches of learning by establishing centers of post-graduate study and original research in different parts of the state”

The University of Kerala functioned as the single University in the state till 1968. In 1968 the University of Kerala was bifurcated and the second University – the University of Calicut came into being that year and took over the affiliation of the Colleges in the northern areas of the state including Malabar and portions of the Cochin state. Subsequently other Universities were enacted, the University of Cochin now the Cochin University of Science and Technology in 1971, Kerala State Agricultural University in 1972, Mahatma Gandhi University in 1983, Sree Sankaracharya University of Sanskrit in 1993, and Kannur University in the year 1995.

During 1977, the University of Kerala celebrated its Diamond jubilee. The celebration involved the starting of new teaching Departments, conduct of science fest, seminars and setting up of new buildings.

The University of Kerala has widened its activities by entering into academic cooperation with some foreign universities like Valladolid of Spain, Mont Clair and Claremont of the United States of America. The
UGC has identified the university as one of the 26 institutions selected for promotion of India study by foreign students.

3.4.7.1 Research activities

Scientific research has become the lifeblood of a progressive State, and its promotion is an integral and fundamental function of education. From the very inception, university of Travancore has given much importance in research activities. In 1937 under the auspices of the University of Travancore, a separate research Department was instituted. Its object was to bring within one organization the scientific units attached to different Government Departments and the science Departments of the University.

During the period many proposals and schemes were accepted by the government and the University, which were the back bone of the research and development activities of the University. The major proposals

- An institute, called the central Research Institute, to co-ordinate the research work of the various research sections for scientific research to improve the research in Agriculture, Industries and Public health in the state. The general administration of the Institute should vest in the University

1. with a council of research as the chief advisory body.

2. The following institutions, with the staff and equipment attached to them should be transferred to the Institute in the University.
a) The Water Analysis Section of the Water Works under the Public Works Department

b) The Research Section of the Dept of Industries.

c) The Research Section of the Dept of Agriculture.

d) The Public Health Laboratory

e) The Observatory

3. The routine work of the Development Departments which is done in their own laboratories should be guaranteed by the University, and developments, which have no laboratories of their own, should be assured of laboratory service by the central Research Institute.

4. A Central Library of reference books and scientific journals should be organised.

5. Fellowships for research should be created from university funds and from endowments.

6. Degree by research should be instituted in carrying it out should be encouraged to conduct research work and to supervise and guide research students.

7. The department of Marine Biology and Fisheries started after the formulation of the University should form a component part of the Central Research Institute and now isolated and separate units should not be started without examining the possibility of the
service required of them being obtained from the Central Research Institute with additions to the Institute if necessary.

The Government sanctioned these proposals and in 1939 a Central Research Institute started functioning and a council of Research was also appointed to avoid overlapping and to ensure the needs of the state the department of Research was working in close collaboration with Government departments of Agriculture, Public Health, forests, industries and others. Organization of the Department of research is given as figure 3.1.
ORGANISATION OF THE DEPARTMENT OF RESEARCH

GOVERNMENT — THE UNIVERSITY

(Director)

DEPARTMENT OF RESEARCH

(COMPANIES)

The Central Research Institute.

(Divisions)

General.

Applied Biology.

(Page 63)

Applied Chemistry.

(Page 123)

Marine Biology and Fisheries.

(Page 243)

Public Health Laboratory.

(Page 325)

Observatory.

(Page 311)

Statistics.

(Page 421)

Administration.

Stores.

Library.

Gas House.

Special Schemes.

Oil Distillation.

Model Salt Factory.

Essential Oils.

Agar-Agar.

Scheme

(Chief Officer).

N.B.—Arrow-heads indicate contact in technical matters without administrative control.
But the biggest handicaps encountered by the Department of research are the outbreak of the war in September 1939, soon after the formation of the Central Research Institute. It was almost impossible to build or equip new laboratories. The lack of apparatus, chemicals and books in the laboratories, which had been transferred, was so great that it stood in the way of the expansion of activities. The Department of research has been called upon to assist in many ways in schemes of industrialization in the state. A number of research students have been selected for training overseas, and officers of the department of research are members of government committees and attend conferences concerning Post-War Reconstruction.¹³

University of Kerala has been carrying PhD programme in various disciplines with great care and attention. Despite its financial difficulties, the University has been making liberal allotment in the annual budget for the provision of fellowships to research scholars.

Ph.D. programme is part of the regular work of the teaching and Research Department of the University. Several teachers have research projects financed by external funding agencies, which add substantially to general research output of the Department (Appendix II). Department of Botany and Aquatic biology from the science Departments were selected under the Special Assistance Scheme (DSA) of the UGC. Moreover, the University has also taken important measures for the qualitative improvement of research and consultancy activities.
There are sixteen Faculties under the University of Kerala

1. Arts
2. Social Science
3. Science
4. Oriental studies
5. Fine Arts
6. Commerce
7. Education
8. Ayurveda
9. Engineering Technology
10. Media
11. Law
12. Dentistry
13. Homeopathy
14. Management Studies
15. Physical Education
16. Applied Science
3.4. 7. 3 University Departments under the faculty of Science

There are ten University Departments under the faculty of Science, University of Kerala. They are:

1. Aquatic Biology and Fisheries
2. Biochemistry
3. Botany
4. Chemistry
5. Demography
6. Geology
7. Mathematics
8. Physics
9. Statistics
10. Zoology

A brief account of the teaching and research Department under faculty of science, University of Kerala is given below.
Figure 3.2 Name of Departments under faculty of Science and its year of establishment

<table>
<thead>
<tr>
<th>Department</th>
<th>Year of Establishment</th>
</tr>
</thead>
<tbody>
<tr>
<td>AB - Aquatic Biology &amp; Fisheries</td>
<td>1938</td>
</tr>
<tr>
<td>BC - Biochemistry</td>
<td>1961</td>
</tr>
<tr>
<td>BO - Botany</td>
<td>1959</td>
</tr>
<tr>
<td>CH - Chemistry</td>
<td>1939</td>
</tr>
<tr>
<td>DE - Demography</td>
<td>1979</td>
</tr>
<tr>
<td>GE - Geology</td>
<td>1963</td>
</tr>
<tr>
<td>MA - Mathematics</td>
<td>1965</td>
</tr>
<tr>
<td>PH - Physics</td>
<td>1970</td>
</tr>
<tr>
<td>ST - Statistics</td>
<td>1945</td>
</tr>
<tr>
<td>ZO - Zoology</td>
<td>1968</td>
</tr>
</tbody>
</table>

Period under study (1980 - 1999)
3.4.7.3.1. Department of Aquatic Biology and Fisheries

The Department of Aquatic Biology and Fisheries was started in 1938. Initially research activities were relating to fauna, flora and Fishery resources of Kerala coast and wage bank areas. Apart from this Department made achievements in the thrust areas such as ecological investigation on Astamudi, Kadinamkulam, Paravoor, Veli estuarine systems and on various freshwater bodies, man-made reservoirs village ponds, selected rivers, the extend and nature of pollution in the inland and coastal water bodies of Kerala.

In addition, the Department undertook several research programmes on various aspects of Aquaculture such as nutrition, Physiology, pathology and genetics of various Fishes and Prawns. Production on antibiotics by microbes, particularly from streptomyces of marine environment against known pathogens of human and fish origin was attempted in details. The L-asparaginaset isolated from streptomyces is considered to be of pharmaceutical importance to test against cancerous cells.

The Department has received with opportunities for taking several research schemes funded by various international and national agencies like Government of Netherlands IRDC, UGC, CSIR, DOD department of Fisheries etc., This Department has also been identified for conducting Environmental impact studies by agencies like NTPC, WAPCOS, KSEB.
etc. The areas of research are mainly in Aquatic Ecology, Aquaculture Microbiology, and Fish and Shellfish disease.

3.4.7.3.2. Department of Biochemistry

The Department of Biochemistry was started as a unit of the chemistry Department in 1961. It became a division of Biochemistry and later a full-fledged Department in 1970. Right from its inception, the Department has been concentrating on research on problems of human relevance. The thrust areas of research include Experimental atherosclerosis and allied diseases, Experimental diabetes and allied diseases, biochemistry and immunology of parasites, filariasis, Matrix biology, Cell surface macromolecules and cellular interaction, environmental biochemistry and biochemical toxicology, micronutrients in health and disease, Bioactive substances of national origin, cellular biochemistry and alcoholism.

Independently and in collaboration with various laboratories in India and abroad, a number of nationally and internationally funded research programmes have been successfully undertaken by the Department.

Fairly well equipped research laboratories, with facility for tissue culture, radiotracer work and animal house, are housed in an independent building in the Kariavattom Campus. During the last three decades, more than 100 students have taken their PhD from the Department and more than 600 papers have been published in various International and National journals.
3.4.7.3.3 Department of Botany

The Department of Botany, University of Kerala, established in 1959, is well known for its outstanding research in cytology and cytotaxonomy. The Department offers a special MSc course in Genetics and plant breeding and an M.Phil programme with most modern curriculum. The Department was recognized by the UGC for the award of Department research support was elevated to the level of Departmental special Assistance programme. The Garden of the Department maintains many important and rare plants of medical importance, valuable pteriodophytes and wild varieties of cultivated cereals. The Department has well established tissue culture laboratories for carrying out all types of tissue culture work and a molecular biology laboratory for advanced research.

More than 950 papers and 6 books on varied aspects have been published in National and International journals and a number of papers were presented in National and International symposium. About 65 students have taken Ph.D degree from the Department. About 7 National Seminars were conducted in the Department on different aspects within the thrust areas and the proceedings of all the Seminars have been published. The main areas of research include Cytotaxonomy, Palynology, Biotechnology, Tissue culture, Molecular biology.
3.4.7.3.4 Department of Chemistry

The Department of chemistry was established in 1937. It offers MSc, M.Phil and Ph.D programmes. The research activities are going on in the field of coordination chemistry, thermal decomposition of solids, redox titrimetry in aqueous and non-aqueous media, pharmaceutical analysis, photochemistry, organic synthesis, heterocyclic chemistry, chemical kinetics water quality management, corrosion management and renewable energy source. Till 1998, 136 students have been awarded PhD degree and around 500 research papers have been published in standard national and international journals. Both the teaching staff and students of this Department have attained excellent positions. Two staff members got the prestigious Humboldt Foundation Fellowships and three got UNESCO Fellowships.

3.4.7.3.5 Department of Demography

University of Kerala has the distinction of being the first University in India to introduce Demography as a scientific discipline at the postgraduate level in 1963. Initially the Department was attached to the Department of Statistics. It became full-fledged department- Department of Demography and population studies in 1979. In 1997 the Department was renamed as Department of Demography.

The Department offers MSc, M.Phil and Ph.D programmes in the field of population. Population Research center (PRC), a Government of India scheme was also attached to the Department which actively
conduces various surveys in the areas of Family Welfare Maternal and child health and Reproductive health. An international journal (Janasamkhya) (biannual) is being published regularly from this Department.

3.4.7.3.6 Department of Geology

The Department, established in the year 1963 at the Senate Hall Campus, was shifted to the Kariavattom Campus in the year 1968. The Department offers Msc, M.Phil and Ph.D Programmes. The teachers of the Department have successfully executed research projects funded by the Department of Science and Technology, Environment and Ocean Development, Government of India, UGC and state committee on science technology and Environment. The Department of Geology functions as a consultant to agencies like Kerala State Electricity Board and has to its credit several scientific papers published in reputed research journals. The major areas of research include Sedimentology, Kinematics of shear zones and Hydrogeology.

3.4.7.3.7 Department of Mathematics

The Department of Mathematics started functioning as an independent Department in 1965. The Department offers Msc and M.Phil programmes. The major areas of research include semi group theory and applications, approximation theory, cumulative Algebra and graph theory and information theory. The Department has undertaken several research projects including a major U.G.C project on applications of structure
Theory of regular semi groups. The Department has organized international and national symposia, several refresher courses, workshops and conferences including conferences of Indian Mathematical society and Ramanujam Mathematical society. Over the years the Department produced 19 Ph.Ds and more than 100 M.Phil degrees.

3.4.7.3.8 Department of Physics

The Department of physics was established in August 1970. It offers MSc, M.Phil and Ph.D programmes. Since 1971 more than seventy students have been awarded Ph.Ds by the University of Kerala. The Department’s R&D infrastructure includes crystal growth laboratory, thin film laboratory, Vibrational spectroscopy laboratory, Nanostructural material laboratory, and observation and space physics laboratory. Apart from this the Department has H.F Doppler Reader, the first of its kind in India set up in 1984 to study the equatorial F-region plasma motion. It provides facility to measure three dimensional plasma motion in to the equatorial F-region. Another facility is the 100 feet observation Tower, established by ISRO under the IGBP programme. The major areas of research include Vibrational spectroscopy (infrared, Raman) thin films, Nanostructured materials, crystal growth, Spectrophotometric Studies, Inospheric physics, Space Physics etc.

3.4.7.3.9 Department of Statistics

The Department of statistics was formed in 1945. Data shows that there is a remarkable increase in the number of research papers in
Theoretical statistics published by members of the Department in journals of international reputation and in the number of Ph.D thesis in theoretical statistics submitted to the University of Kerala.

The Major areas of research in the Department during this period include Mittag-Leffles processes, Inequality indices, UMVU Estimation, Discrete Distributions, Integrated Cauchy functional equations, characterizations, Order statistics and Operations in parametric estimation, Generalised hypergeometric probability Distributions and application in parametric estimation.

3.4.7.3.10 Department of Zoology

The Zoology Department of the University of Kerala was established in 1968. From the very inception the Department was organized as a center of excellence in the fields of invertebrate Neuroendocrinology and Reproductive physiology, with generous assistance from the Ford Foundation and PL-480 scheme of the U.S Government. Apart from the above the research activities of the Departments have been extended to various other areas such as entomology, soil biology, vector biology, Vertebrate ethology, Animal physiology, wild life biology, Forest ecology, conservation biology etc.,

The Department has produced over 100 M.Phil and 90 Ph.Ds. Besides, the faculty members have also undertaken research projects sponsored by various agencies such as DST, DBT, CSIR, UGC, STEC, Ministry of Forest and Environment etc.
The Department's research laboratory is equipped with various modern equipments such as spectrophotometers, refrigerated centrifuges, fluorescence microscope, Laminar flow, inverted microscope, clinical analyzer, HPLC etc. Over the years, the Department has organized a number of national and International conferences. The Department has a very good library with more than 4000 books and several scientific journals in its subscription list.

An international journal Viz: ENTOMON, which is the official publication of the Association for the advancement of Entomology, is being published regularly from this Department since 1976.

Table 3.3 List of courses offered by the Departments under the science faculty

<table>
<thead>
<tr>
<th>Faculty of Sciences</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Aquatic Biology &amp; Fisheries</td>
<td>M.Sc., M.Phil., Ph.D.</td>
</tr>
<tr>
<td>Bio-chemistry</td>
<td>M.Sc., M.Phil., Ph.D.</td>
</tr>
<tr>
<td>Botany</td>
<td>M.Sc., (Genetic &amp; Plant Breeding) M.Phil., Ph.D.</td>
</tr>
<tr>
<td>Chemistry</td>
<td>M.Sc., (Analytical Chemistry), M.Phil., Ph.D.</td>
</tr>
<tr>
<td>Demography &amp; Population Studies</td>
<td>M.Sc., M.Phil., Ph.D.</td>
</tr>
<tr>
<td>Geology</td>
<td>M.Sc., M.Phil., Ph.D.</td>
</tr>
<tr>
<td>Mathematics</td>
<td>M.Sc., M.Phil., Ph.D.</td>
</tr>
<tr>
<td>Statistics</td>
<td>M.Sc., M.Phil., Ph.D.</td>
</tr>
<tr>
<td>Zoology</td>
<td>M.Sc., M.Phil., Ph.D.</td>
</tr>
<tr>
<td>Physics</td>
<td>M.Sc., M.Phil., Ph.D.</td>
</tr>
</tbody>
</table>
3.5 Conclusion

The University of Kerala being the oldest University in the State has contributed significantly to the overall growth and development of the State. It occupies the position of the mother University in the state, has been at the centre of all higher education activity in Kerala. It has succeeded in making significant and qualitative improvement in teaching by modernizing curriculum, restricting causes, offering new programs order to cope up with the present day developments.
REFERENCES

1. **UNESCO** (1973) Learning to be: The world of education today and tomorrow. New Delhi, Sterling. p.40


4.0 Introduction

The term bibliometrics was first coined by A. L. Bowley in 1860. It was preferred to the existing terminology “statistical bibliography” or “bibliometric statistics” because of the likelihood to misinterpret it as bibliometrics of statistics. The term bibliometrics is “The application of mathematical statistics and other media of communication”.

Though the term is a fairly recent origin, substantial studies were performed much earlier by the work of Holme (1921) and J. W. H. Cole (1917). Early studies of this type were frequently referred to as statistical bibliography.

Ranganathan suggested as early as 1919 at the Annual Conference in Leamington Spa, that it is necessary for librarians to study the parameters on the lines of biometry, econometrics and psychometrics. Since many of the matters concerned library work and services, Ranganathan suggested that bibliometrics should be a section of library science. Ranganathan in a paper submitted at the first annual seminar of the Library Association.