

REPORT OF THE NANYANG UNIVERSITY CURRICULUM REVIEW COMMITTEE

NANYANG UNIVERSITY, JURONG, SINGAPORE. 1965

The Vice-Chancellor,
Nanyang University,
Jurong Road, Singapore 22.

Dear Sir,

We have the honour to present the report of the Curriculum Review Committee set up by the University on 20th January 1965.

We have approached the task of the Committee with diffidence and with respect for the University's integrity. We have had no wish to cause embarrassment to any member of your staff. Our recommendations have been made because we believe that the University has a future. In all humility, we hope our recommendations will help you to ensure the rapid growth and development of the University.

We are unanimous in wishing to draw your attention to one key feature of our recommendations. We believe that all the twelve Departments of the three Colleges and the Language Centre should have strong Professorial Heads. Every effort should be made to recruit the best persons possible.

We are aware how difficult it is to find suitable scholars to fill these posts. Perhaps it might be necessary to send a special emissary to Universities here and overseas in search of such eminent men. Such an emissary should be given considerable powers to appoint the right people on your Behalf. He should be given clear directives about the kind of scholars needed, the facilities available, the future plans of the University and about such other matters which will help him attract the persons needed. An emissary with such power and responsibility should be given at least six months to complete his task. We are convinced that this is the most effective way of obtaining the Professorial Heads you want.

We have received every co-operation from you and your colleagues and we have been particularly fortunate in your choice of Mr. Koh Thong Ngee as our Secretary, without whose help much of the work of the Committee would have been impossible.

Yours sincerely,

(Wang Gungwu) *Chairman*

(Thong Saw Pak) *Member*

(Koh Seow Tee) *Member*

(Lu Yaw) *Member*

(Wang Shu-min) *Member*

(Lim Ho Hup) *Member*

(Liu Kung-Kwei) *Member*

14th May 1965.

THE NANYANG UNIVERSITY CURRICULUM REVIEW COMMITTEE

MEMBERS

Professor Wang Gungwu (Chairman)	Professor of History, University of Malaya.
Mr. Koh Seow Tee	Lecturer, Singapore Polytechnic.
Mr. Lim Ho Hup	Director of the Economic Development Board, Singapore.
Professor Liu Kung-kwei	Professor of Accountancy; Head of Department of Accountancy; Acting Dean of Commerce, Nanyang University.
Mr. Lu Yaw	Principal Assistant Director of Education, Ministry of Education, Singapore.
Professor Thong Saw Pak	Professor of Physics, University of Malaya.
Professor Wang Shu-min	Visiting Professor of Chinese, University of Singapore

SECRETARY

Mr. Koh Thong Ngee	Acting Librarian, Nanyang University.
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CHAPTER ONE: Introduction

1. The terms of reference of this Committee are: "To review the current organisation of courses of study and contents of individual courses in Nanyang University and to recommend to the University revised courses of study adapted to the needs of our society."

2. We examined in detail the present degree structure, all courses of study and the examination system, and made recommendations on all aspects of the curriculum as well as on matters concerning the teaching staff relevant to our recommendations on the curriculum. The contents of the Prescott Report and the Gwee Ah Leng Report on the University were noted and all relevant documents pertaining to our review were closely studied. Three academic sub-committees were set up to study the curriculum of each of the colleges and one other sub-committee to study matters concerning the teaching staff. We met several key members of the staff and, as most of our meetings were held at the University itself, there was ample opportunity to see the existing facilities for ourselves.

3. It appears to us that the University has so far served only a limited purpose. Attention has been paid to producing large numbers of graduates without adequate consideration of the prospects of employment for the graduates, or of high standards of teaching and research, or of the fundamental objectives of higher education in a plural society. It has so far catered only for students from the Chinese-medium schools in the country. We feel that this function is too narrow and a great deal can be done to re-orientate the University towards serving our society as a whole.

4. We feel that the nature of our society must be reflected in any institution of higher learning which purports to serve that society. In order to achieve this, the courses of study in the University must be adapted to ensure that students from all streams of education in the country may benefit from the University's existence.

5. Our society is greatly concerned with the prosperity and peaceful development of our new nation of Malaysia. In this context, there is an urgent need for people with a deep, rational and sympathetic understanding of the multi-racial basis of the country. The University should produce graduates able to guide the course of the country's development, and trained to administer the public services and manage the growth of commerce and industry, and specially equipped to meet the nation's need for rapid modernisation.

6. We therefore believe that particular attention must be paid to the problem of necessary language skills. It should be the aim of the University to produce graduates who are at least bi-lingual, if not tri-lingual, in the languages relevant to the development of the country.

7. We also came to the conclusion that the degree structure itself should be revised in order to bring out the best in all students and to produce the kind of graduates needed.

CHAPTER TWO: Recommendations on Language

8. In view of the changing conditions in our society, language training has become one of the key issues in the future development of the University. We recognise that the University still has a role to play in providing higher education to graduate of the Chinese-medium schools in Malaysia and may still be expected to provide courses taught in the Chinese medium. It is clear, however, that it is not in the interest of the graduates themselves to be proficient only in Chinese nor is it in the interest of the country for the University to continue producing graduates of that kind. We feel strongly that the graduates should have fluency in the National Language as well as in English if the University is to play its full and effective role in the country. Therefore, we strongly recommend that every opportunity should be provided for the students to acquire proficiency in these languages.

9. We also recommend that entrance qualifications concerning languages be carefully and clearly defined so that students from all streams of education in the country are eligible for admission. Students admitted from the Chinese-medium stream must be required to attain fluency in the National Language or English. Students admitted from the English-medium stream should be required to attain proficiency in the National Language or Chinese. Students admitted from the Malay-medium stream should be encouraged to attain proficiency in Chinese or English. All students should be given the opportunity to study the three languages stated above.

10. The present freshman language courses in Chinese and English required throughout the University are not satisfactory. We recommend that language courses should be carefully drawn up to meet the needs of different groups of students. Students with proficiency in Chinese should not be required to take freshman Chinese, but should be required to take suitable courses in the National Language. Students with proficiency in English should not be required to take freshman English, but should be required to take courses in Chinese. Students with proficiency in the National Language should be encouraged to take suitable courses in either Chinese or English.

11. Students should be made to use, through a system of regular written assignments, the language in which each course is conducted. In this way, they are expected to use the language concerned as a tool for the mastery of their chosen subjects. If students can see how a language is used in the context of the knowledge they wish to acquire as well as of the needs of the society they intend to serve, they will develop a keener interest in using the relevant languages during their stay at the University.

12. At present, language teaching, apart from Chinese, is provided by the Department of Modern Languages and Literature. The Department offers a large variety of courses in English at different levels and in English Literature. In addition, it offers a few courses in elementary Malay, French, German and Japanese. We consider this arrangement to be unsatisfactory for the following reasons:

- (a) The National Language is not given enough emphasis.
- (b) The Department offers what amounts to a degree in English literature. In view of the poor standard of English among students on entry, such a degree course is not of a sufficiently high standard to merit continuation.
- (c) The teaching of several languages in a Department which concentrates on English Language and Literature is not an efficient way to serve the language needs of the University as a whole. What is urgently needed is an institution established for the specific purpose of giving all students language proficiency at several levels in order to enable them to use the language as tools for research and for the service of the country.

13. We therefore recommend that,

- (a) The Department of Modern Languages and Literature be abolished.
- (b) A Language Centre be set up to serve the whole University.
- (c) The National Language be given full recognition by the immediate establishment of a Department of Malay Studies.

14. We recommend that the Language Centre be set up in the following manner:

- (a) The Language Centre shall offer no degree.
- (b) It should not be in the College of Arts, but should be a separate institution.
- (c) It shall be administered by a Head of the Centre who shall carry the status of a full professor.
- (d) It should be staffed primarily by language teachers whose recruitment should be based on the skills and experience they have had in language teaching.
- (e) It shall offer at least two kinds of courses,
 - (i) credit courses in languages chosen by various Department as partial fulfilment of their respective degrees;
 - (ii) non-credit courses leading to a certificate after at least two years, such certificates to be given to students who have satisfied all class, laboratory and examination requirements.
- (f) The Centre should be provided with the most up-to-date equipment and courses should be taught to small groups of students making the maximum use of the latest techniques.
- (g) Each course should be carefully designed to help specific groups of students in their chosen disciplines.

- (h) Where elementary and intermediate courses in Chinese and the National Language are concerned, the Centre should work in close co-operation with the Department of Chinese Language and Literature and that of Malay Studies.
- (i) The Centre shall administer a central language laboratory and such other language laboratories as are needed by the Colleges.

15. Language teachers, depending on qualifications and experience, may be appointed to salary scales comparable to that offered to the academic staff, but their scales should not be less favourable than that offered to senior language teachers of comparable standing in the Teachers Training Colleges in the country. In many cases, it may be enough to appoint part-time teachers at suitable rates.

16. We recognise that some students may not be able to take all the language courses they need during the academic terms. Such students should be given full opportunity to take their language courses during the long vacation. The language teachers, therefore, are expected to offer several intensive language courses in English, the National Language and Chinese whenever these courses are needed.

17. With the setting up of the Language Centre, the language teaching resources of the University will be as follows:

- (a) The Language Centre shall be responsible for teaching all elementary and intermediate language courses in the University. These languages may include the National Language, English, Chinese, German, French, Japanese and such other languages required from time to time. The Centre may also provide advanced courses in any language whenever necessary. In the case of Advanced Malay and Advanced Chinese, the courses should be offered in conjunction with the two Departments concerned.
- (b) The Department of Chinese Language and Literature shall continue to provide advanced courses. (see revised Curriculum in Chapter Six)
- (c) The Department of Malay Studies should be established to provide advanced courses leading to both the pass and the honours degrees. (see suggested syllabus in Chapter Six)

CHAPTER THREE:

Remarks on the Existing Curriculum

18. The degree structure is at present based upon a modified credit system which demands that each student obtains a total number of 128 credits spread over four years before he is granted a pass degree. The flexibility of the credit system, however, does not seem to have been fully appreciated.

19. There have been numerous changes in the course structure and the syllabuses of the University during its nine years of existence. These changes, largely due to the

quick turnover of teaching staff, have led to many anomalies and inconsistencies in several departments. Frequent changes not only affect teaching, but can have an unsettling effect on students.

20. The courses of study seem to be entirely dependent on formal lectures. There does not seem to be the personal and intensive contact between staff and students so essential in university teaching. Students are not given adequate written assignments and therefore have little opportunity to improve their skill in reading, in the selection of materials, and in the organisation and presentation of data and ideas. There is also an excessive dependence on textbooks and printed lecture notes. Many of the courses are not based on up-to-date publications, and very few of them make use of the materials in recent periodicals.

21. Some courses appear to be too broad to be adequately covered in one semester or even one academic year. Other courses which are offered for students in their third or fourth year appear to be too elementary. Some courses are broken down too far and are too narrow and specialised. As a result, there is a great disparity in the assignment of credits to each of the courses. It is unsatisfactory to have courses with the present range of credits from two to twelve.

22. Division of courses into required and elective categories also appear to be arbitrary. There is often a lack of a logical sequence in the arrangement of courses for the different years.

23. The first year programme for most departments is weighed down by general language courses in Chinese and English. As organised at present, these language courses are either too easy as university courses, or are not really suitable for a student pursuing a particular subject. Even worst they take far too much of a student's time and in any case, are unlikely to help him make up the deficiency in the two languages.

24. The courses in the present system depend on an excessive number of examinations. A great deal of time is spent preparing students for these examinations and marking examination papers. Frequent examinations discourage students from using their initiative in reading widely and in the important training in self-study. Further, in the examinations, students are given very little choice in examination questions. This also discourages students from exploring the full range of their chosen fields of study, while it compels students to memorise set answers.

25. We were particularly disturbed to discover that the University does not have a uniform grading system for the examinations. It appears that members of staff are unable to agree on the use of percentages. This leads to great inconsistency in marking and creates extremely difficult problems of assessing a student's academic achievements. The lack of statutory Boards of Examiners for each College is a most serious defect in the existing examination system.

26. The graduation examinations which now consist of three courses are unsatisfactory for two reasons. Firstly, the choice of the courses is quite arbitrary; the courses may be chosen from those taken in the second, third or fourth year of study. Secondly, the students sit for the examinations twice, once with questions set and marked by the lecturers concerned alone, and the second time with another set of questions set and marked by the same lecturers but moderated by the External Examiners. This duplication of the examinations is both wasteful and misleading. It is difficult to see how this form of external examinations can really help to determine the standards achieved and the relative merits of the students.

CHAPTER FOUR:

Recommendations on a New Degree Structure

27. In consideration of:

- (a) The importance of producing graduates best suited to the needs of our society; and
- (b) The desirability of instituting a system which will bring out the best in the undergraduates and provide the most benefits to the graduates,

we recommend that a new degree structure be included.

28. The new degree structure should provide for a pass degree and an honours degree. The honours degree shall be classified on the results of the honours examinations as follows:

Class I Honours

Class II (Upper) Honours

Class II (Lower) Honours.

29. The credit system, if carefully applied, is adequate for the purpose of a pass degree. In the new degree structure we recommend that the pass degree be entirely based on the credit system. After careful consideration of the range and contents of courses required, we agree that students completing 108 credits of full academic value may be deemed to have qualified for the degree. This should normally be done in three or four years. No student may be granted a degree if he fails to obtain the required number of credits after five years of study in the University.

30. We noted the introduction of the Higher School Certificate (Chinese) Examinations in 1963 in Singapore and are satisfied that this has brought about a higher standard of admission. We recommend that the normal entrance requirement be the Higher School Certificate or its equivalent. Students admitted with such qualifications should be able to obtain their pass degree after three years of intensive study. In exceptional cases, students admitted to the College of Science may be exempted from all the first year courses in Part I. Such direct entry students would be allowed to

complete the required 108 credits within two years, but they must go on to take the honour courses in their third year. Unless they have completed three years of study at the University, they may not be awarded any degree.

31. We recommend that there should be only two types of courses for the pass degree, three-credit courses and six-credit courses. Each course consists of a number of lectures and tutorials/seminars or practical classes. These are defined by the individual College in the relevant chapters of this Report.

32. In order to ensure adequate opportunity for academic discussion between staff and students, we strongly recommend the institution of tutorials/seminars. By tutorial/seminar, we mean a small group of not more than eight to ten students regularly gathered for study and discussion. The basis of this small group study should be written assignments by the students themselves. Staff and students should treat their regular meetings at the tutorials/seminars as the most important part of university education. At these meetings, the students' written assignments should be discussed fully, and students be encouraged to discuss all questions relevant to the topic at hand as well as to the course as a whole. These assignments should be carefully graded and the grades recorded. These grades should not count in the examination except where they can help the examiner determine the students' examination results.

33. The honours courses shall not follow the credit system. They should be offered only to students who have completed the required 108 credits within two years and to those who have done extremely well while obtaining their pass degrees within three years. Students who have done exceptionally well while obtaining their pass degrees within four years may also be considered.

34. Each course in the new degree structure should be followed by only one examination taken at the end of the course: a three-credit course by an examination of at least two hours and a six-credit course by an examination of at least three hours. Students who fail the examination for any course may, at the recommendation of the relevant Board of Examiners, be allowed to sit for a supplementary examination.

35. Students must obtain the minimum number of credits specified for each academic year. We recommend that a student who fails to obtain the required minimum of credits for that year shall be asked to leave the University.

36. For the pass degree, we recommend that the examinations for a number of courses should be moderated by External Examiners. These courses are specified in the relevant paragraphs of Chapters Six, Seven and Eight.

37. The honours degree examinations should consist of a number of papers to be taken at the end of the academic year. These examinations should be moderated by External Examiners and must be passed at one and the same time. The examinations should also include, wherever possible, a graduation paper or report which the student

must pass before he can obtain the honours degree. No supplementary examinations are allowed and no student may repeat the honours degree examinations.

38. We recommend the use in all courses not only of up-to-date books and monographs, but also of the latest articles in learned periodicals. Students must be discouraged from depending on the view of any one book or any one person in their studies. It is the essence of university education to give students full opportunity to consider the many sides to a question and the various interpretations possible. Special care should be taken to ensure that adequate library facilities be provided to meet the needs of all the courses of the new degree structure.

39. We strongly recommend a uniform marking/grading system for each College and, if possible, for the whole University. All percentages and marks should be translated into a non-numerical system agreed to by the College concerned. This is particularly important for the following reasons:

- (a) It is essential to use the same grading system for courses taken within and outside of a Department or College.
- (b) The new degree structure involves qualifying for honours courses and classifications of honours degrees. This depends greatly on a uniform grading system for assessing the work done over a wide range of courses.

40. We recommend the institution in each College of the following Boards of Examiners:

- (a) The Board of Examiners for First Year courses.
- (b) The Board of Examiners for specified pass degree courses moderated by External Examiners.
- (c) The Board of Examiners for the honours degree.

These Boards of Examiners shall each comprise all teaching staff responsible for the courses. The Boards shall make recommendations concerning examination results to the relevant College Faculty. These, in turn, are presented to the Senate for approval.

41. Each Department shall have at least one External Examiner. The External Examiner shall moderate the specified papers for the pass degree and those for the honours degree. Each Department, with the advice of the External Examiner or Examiners concerned, submits the results to the relevant Board of Examiners. In addition, the External Examiner shall write a confidential report and send it directly to the Vice-Chancellor.

42. We recognise that the curriculum of any Department has to be revised from time to time to meet changing needs. We therefore recommend that a Committee on Curriculum consisting of Heads of Departments be set up for each College to report on necessary amendments to the curriculum to the respective Faculty meeting.

CHAPTER FIVE:

Recommendations on Teaching Staff

43. We are convinced that our recommendations on the new degree structure must lead us to make other recommendations concerning the recruitment of suitable teaching staff. We feel strongly that courses should be taught by members of staff with the necessary research experience, preferably with publications in the field. By publications, we mean publications in learned journals or original studies published as books or monographs. It is normally unsatisfactory for teaching at the university level to be done by staff who are not actively conducting research in the field in which they are engaged to teach.

44. We recommend that the establishment in each Department should be determined by the actual teaching requirements in that Department. The number of staff should be closely related to the number of students in Department. The normal establishment should consist of a reasonable number of staff in each of the four categories: professors, associate professors, lecturers and assistant lecturers. A good working ratio for these four categories would be 1 : 2 : 5/6 : 2. The total staff-student ratio for the whole University should not normally exceed that of 1 : 10.

45. Academic status must be closely related to relevant research and teaching experience. We recommend the following minimum qualifications for the guidance of Boards of Selection:

- (a) An assistant lecturer should normally have a Master's degree. This should be a probationary appointment subject to review after three years of service.
- (b) A lecturer at the initial point of the scale should normally have a Master's degree plus three years of teaching experience or a doctorate from an established university; or a good first degree plus relevant professional qualifications.
- (c) An associate professor should normally have a doctorate from an established university plus at least five years of teaching experience at the university level, with publications in reputable academic journals or original works published as books or monographs.
- (d) A professor should normally be an outstanding scholar with university teaching experience and publications of recognised value.

All academic staff should show continued research activities and should be recruited with the expectation that their research will contribute to the reputation of the University.

46. We are convinced that at this stage of the University's development each Department needs a strong Professorial Head. This is particularly important in the light of the new degree structure recommended. It is expected that a professor recruited as Head of Department should have shown administrative ability.

47. We are concerned that the University obtain the best staff possible for the implementation of the new degree structure. Two factors must be given full consideration if the recruitment of staff of quality is to be ensured. Firstly, research facilities must be provided. Secondly, the salary structure must be attractive and there must be security of tenure.

48. We recommend that the recruitment of staff with research skill and potentiality be supported by research facilities. Books and equipment needed for research should be adequately provided. Active research is an essential feature of a good university. A university's reputation is made not only by producing good graduates but also by the contribution to knowledge of its academic staff. Staff of research ability would be difficult to recruit, and even more difficult to keep, if facilities for research are not provided and are not improving all the time. We believe that staff engaged in research are in a better position to win the respect and confidence of their students, and are themselves an inspiration to students of high academic quality.

49. The recruitment of staff with the high qualifications required must be based on a salary structure comparable to that in major universities in the world, and particularly to that in other universities in Malaysia. A realistic approach to revising the salary structure must take into account that salaries in other Malaysian universities are applied to a different establishment structure. We recommend that new salary scales be immediately drawn up, and staff be appointed as soon as possible to these new scales.

50. Salaries should be based on qualifications and experience and not on the number of teaching hours undertaken. We emphasise, however, that the normal total teaching load including formal lectures and tutorials/seminars, field work and laboratory classes should be about ten hours a week and should not exceed fifteen hours a week.

51. We are surprised to find that most of the staff in the Colleges of Arts and Commerce are not provided with their own rooms. We believe that academic staff must be provided with adequate teaching facilities. We recommend that each member of staff be given a room, and such a room to be utilised for tutorials/seminars, as well as to provide him with the privacy and the dignity so necessary to his work. In the case of staff in the College of Science, adequate laboratory space should be provided for research purposes.

52. Library facilities must be adequate, in the first instance, for teaching. Books required for teaching purposes should be given first priority. Staff responsible for teaching each course should be given considerable scope for ordering books essential for the course. Written assignments for small group study cannot be of the required standard unless the necessary books are available to both staff and students in adequate numbers.

53. Staff must be provided with the opportunity to keep in touch with the latest

development in their respective fields. We recommend that a scheme of overseas study leave be drawn up for staff members. We also recommend that staff be supported to attend conferences and such other international meetings relevant to their teaching and research.

54. The University cannot depend on outside teaching staff for an indefinite period of time. There must be every opportunity for the employment of young but highly qualified local graduates with a deep understanding of the conditions in the region. In this way, the University will play an increasingly valuable role in the service of our society. A university thrives on the energy and enthusiasm of its younger staff. In a growing society, the contributions of keen young staff to the university community must be constantly kept in mind.

55. We therefore recommend that the University continue to appoint a select number of graduate assistants from among its graduates of high academic quality but every opportunity should be provided for such graduates to receive research training leading to higher degrees. We note that there is no provision for higher degrees at the moment and recommend that such degrees be instituted as soon as possible.

56. Graduate assistants should not be overloaded with teaching, clerical and other duties as at present, but should be given adequate help and facilities for their research. They should also be provided with the opportunity to study in other established universities abroad. In this way, the University will be guaranteed a steady supply of highly qualified graduates for its future teaching staff.

CHAPTER SIX:

Recommendations on College of Arts

57. We recommend that the College of Arts be reorganised with the following departments:

- (a) Department of Chinese Language and Literature.
- (b) Department of Malay Studies.
- (c) Department of History.
- (d) Department of Geography.
- (e) Department of Government and Public Administration

58. We recommend that the existing Department of Modern Languages and Literature and the Department of Education be abolished and that the present Department of Political Science be modified and renamed the Department of Government and Public Administration.

59. After careful consideration of the functions of the Department of Modern Languages and Literature we have recommended the establishment of a Language Centre for the reasons given in Chapter Two of this Report. Consequently, we see no

need for a Department of Modern Languages and Literature to be retained in the College of Arts. We have also considered the role of the existing Department in producing graduates in English Language and Literature, but we are not convinced that the degree offered is of a sufficiently high standard. We therefore do not recommend the establishment of a Department of English Language and Literature. Instead, provision should be made for the study of English at an advanced level in the Language Centre itself. For such courses, no degree shall be awarded, but special certificates may be given to record the students' attainments. We believe that such certificates will help graduates of any Department who intend to study for higher degrees overseas. Such courses may also be offered as credit courses when they are required for the partial fulfilment for degrees in any of the three Colleges.

60. We recommend that the existing students in the Department of Modern Languages and Literature be asked to transfer to other Departments in the University along the following lines:

- (a) Credits should be given for courses common to the Departments concerned.
- (b) A limited number of courses may, at the discretion of the Heads of Departments concerned, be also credited.
- (c) Of the remaining credits, the Language Centre may award special certificates for the courses which it considers to be of a sufficiently high standard.

61. We strongly feel that the field of education should be that of professional training for teaching purposes and post-graduate research on the educational problems of the country. Where professional training is concerned, graduates of the University should spend one or two years in a professional institution. For research purposes, a post-graduate school of education may well be established. The present Department of Education does not meet either of these two needs. We therefore recommend that the Department of Education be abolished and the undergraduate degree courses in education discontinued.

62. The question of education as post-graduate training either for professional or research purposes is outside our terms of reference. We suggest that this question be studied separately in terms of the needs of our society. A Board of Studies could be set up to consider all the wide-ranging issues.

63. We recommend that the existing students in the Department of Education be asked to transfer to other departments in the University along the following lines:

- (a) Credits should be given for courses common to the Departments concerned.
- (b) A limited number of courses may, at the discretion of the Heads of Departments concerned, be also credited.

64. The Department of Chinese Language and Literature will be expected to

produce graduates with very high standards in the Chinese Language. It should, however, perform the task with the needs of our society clearly in mind. We recommend that the Department place greater emphasis on courses pertinent to the culture, literature and linguistic background of the Malaysian Chinese. The students should be prepared to adapt themselves to the language conditions of the country, and be equipped to study subjects like the nature, distribution and use of local Chinese dialects, Chinese society in Malaysia and the relationship between Chinese and Malay. It is hoped that graduates of the Department will play their part in contributing towards the maintenance of inter-communal harmony in the country. In this context, the University may consider changing the name of the Department to the Department of Chinese Studies.

65. In accordance with our recommendations in Chapter Two of this Report, we recommend the establishment of a Department of Malay Studies. The Department will be expected to offer courses leading to pass and honours degrees. Its purpose will be to provide students who have a good knowledge of Malay with the basic training for research in the language, literature and culture of the Malay peoples. Every effort should be made to attract staff and students of all communities to make the Department a most important cultural bridge both within and outside of the University. Immediate steps should be taken to appoint the Head of Department who shall be entrusted with the task of devising a suitable course structure.

66. We recommend that courses in the Department of History should deal primarily with the history of our region and that this be supported by the study of the histories of other parts of the world. We find the existing courses resting too heavily on the side of Chinese History. While we recognise the importance of Chinese history, we cannot agree that it should be given so much prominence at the expense of Southeast Asian and particularly Malaysian history. We also consider it essential for students to be introduced to historical documents. This could best be done by the use of documents easily available in the country.

67. We recommend that the Department of Geography should revise its courses in order that the different aspects of the subject can be seen as an integrated whole. The courses should be taught with the special features of our region in mind. There must be adequate facilities for practical classes in well-equipped laboratories, field work for the study and application of techniques of surveying, and frequent assignments to students to familiarise themselves with the physical and human environment of the country. It is very important for Geography to be taught as a science and the use of the latest scientific techniques should be encouraged.

68. We consider the whole field of political science to be too wide at this stage in the development of the University and recommend that the Department should concentrate on the fields of Government and Public Administration. In this way, it

may be expected to produce graduates who can be of better use to the public services.

69. We recommend that the new degree structure be set up as follows:

New Degree Structure — College of Arts

Year	Pass Degree ¹ (Three years) Credits	Pass Degree ² (Four years) Credits	Minimum Total Credits
I	27(9) ³	21(6) ³	24
II	27(9)	21(6)	45
III	24(12)	18(9)	66
IV	Honours Courses	18(9)	87
V	—	—	108

1 Or any other suitable variations over 3 years.

2 Or any other suitable variations over 4 years.

3 Figures in brackets represent elective as distinct from required credits.

70. For the College of Arts, each three-credit course consists of one lecture and one tutorial/seminar per week for two semesters, or two lectures and one tutorial/seminar per week for one semester. Each six-credit course consists of two lectures and one tutorial/seminar per week for two semesters. Each honours course in Arts is approximately the same as a six-credit course.

71. The tutorial/seminar is based on students' written assignments. For each three-credit course every student should normally write at least two essays or reports. For each six-credit course, he should normally write at least four essays or reports.

72. For each of the Departments, we have recommended a new course structure. These are listed in the following paragraphs. From the course structures, it will be clear that their success depends largely on intimate co-operation between the Department in the College and also on increased inter-college co-operation. (The courses for which examination to be moderated by External Examiners are marked with an asterisk.)

73. **Department of Chinese Language and Literature.** The following course structure is recommended:

Year I

Required Courses (27 credits)		Credits
Chin. 11	Modern Chinese Literature	3
Chin. 12	Chinese Classical Literature I (Lun Yu & Meng Tzu)	6
Chin. 13	History of Chinese Literature	6
Hist. 12	General East Asian History	6
Lang.	Malay I/Advanced Malay I (for 2 years)	6

Elective Courses (9 credits)

Chin. 14	Introduction to Linguistics	3
Chin. 15	Readings in Chinese Prose	3
Hist. 11	Modern Southeast Asian History	3
Geo. 12	Elements of Human Geography	6
GPA. 11	Introduction to Government	6
GPA. 12	Sociology I	6
Econ. 11	Economic Analysis I	6

Year II**Required Courses (27 credits)**

* Chin. 21	Chinese Etymology	6
Chin 22	Chinese Fiction and Drama	6

OR

Chin. 23	Chinese Poetry	6
* Chin. 24	Chinese Classical Literature II (Shih Chi or Han Shu)	6
Chin. 25	History of the Chinese in Southeast Asia I	3
Lang.	Malay II/Advanced Malay II	6

Elective Courses (9 credits)

Hist. 23	Modern Chinese History	3
Hist. 28	Chinese History (Selected Period)	3
GPA. 25	Sociology II	6
Any of the elective courses in Year I not already taken		3/6

Year III**Required Courses (24 credits)**

* Chin.31	Chinese Phonology	6
* Chin.32	Chinese Classical Literature III (Shih-ching or Ch'u Tz'u)	6
* Chin. 33	History of Chinese Philosophy	6
* Chin. 34	Tz'u and Ch'u	6

Elective Courses (12 credits)

Chin. 35	History of the Chinese in Southeast Asia II	3
Chin. 36	Chinese Classical Literature IV (Chuang Tz'u, or Hsun Tzu, or Han Fei Tzu, or any other approved author)	6
Chin. 37	Chinese Literary Criticism	3
Chin. 38	Chinese Textual Criticism	3
Chin. 39	Malaysian Chinese Literature	3
Hist. 31	History of Malaysia	6
Hist. 32	History of Modern Japan	3
Hist. 33	Chinese History (Selected Period)	3
Geo. 26	Geography of Southeast Asia	6
Geo. 27	Geography of East Asia	6
GPA. 22	Government and Politics of Southeast Asia	3

Honours Courses

- Chin. Hon. 1. Chinese Bibliography
 Chin. Hon. 2. Ancient Chinese Etymology
 Chin. Hon. 3. Special topics in Chinese Literature
 Chin. Hon. 4. Special topics in Chinese Philosophy
 Chin. Hon. 5. Special topics in Chinese Classics: Shang Shu, or Li Chi, or Ch'un Ch'iu Tso Chuan.

74. **Department of Malay Studies.** The following course structure is suggested for two reasons:

- (a) it illustrates the range of courses which the Department would cover;
 (b) it could serve as a guide for the Board of Selection in appointing the Head of Department.

Year I

Required Courses (27 credits)

Mal. 11	Malay Language I	6
Mal. 12	Introductory Survey of Malay Literature	6
Mal. 13	Modern Malay/Indonesian Prose (selected works)	6
Mal. 14	Malay Translation (from or into Chinese/English)	3
OR		
Hist. 11	Modern Southeast Asian History	3
Lang.	(Chinese/English for 2 years, level depending on entrance qualifications.)	6

Elective Courses (9 credits)

Mal. 15	Introduction to Linguistics (may be the same as Chin.14)	3
Geo. 12	Elements of Human Geography	6
GPA. 11	Introduction to Government	6
Econ. 11	Economic Analysis I	6

Year II

Required Courses (27 credits)

* Mal. 21	Malay Language II	6
Mal. 22	Malay Indonesian Comparative Linguistics	6
* Mal. 23	Classical Malay Literature (selected works)	6
Mal. 24	Introduction to Malay Culture and Society	6
Mal. 25	Advanced Malay Translation (from or into Chinese/English)	3
OR		
Hist. 21	Early Southeast Asian History	3
Lang.	2 nd year of language taken in Year I	6

Elective Courses (9 credits)

Mal. 26	One Malay Polynesian language for 2 years	6
Any course offered in Year I and Year II not already taken		3/6

Year III

Required Courses (24 credits)

Mal. 31	Malay/Indonesian Poetry	6
Mal. 32	Advanced Study of Malay Culture & Society, with special reference to Islam in Malaysia	6
OR		
Mal. 33	Introduction to Islamic Law	6
Mal. 34	Advanced Malay/Indonesian Comparative Linguistics	6
OR		
Hist. 31	History of Malaysia	6
Mal. 35	Islamic History	6
OR		
GPA. 12	Sociology I	6

Elective Courses (12 credits)

Mal. 36	Advanced Phonetics and its application to Malay	3
Mal. 37	2 nd year of Malayo-Polynesian language	6
Geo. 27	Geography of Southeast Asia	6
Geo. 34	Geography of Malaysia	6
GPA. 21	The Malaysian Constitution	3
GPA. 22	Government and Politics of Southeast Asia	3
Any course in Year II and Year III not already taken		3/6

Honours Courses

Mal. Hon. 1.	Academic exercise on an aspect of Malay language, literature or society
Mal. Hon. 2.	Sejarah Melayu and related texts
Mal. Hon. 3.	Selected modern Malay/Indonesian authors for intensive study
Mal. Hon. 4.	Advanced Sociology, with special reference to the Malay Peoples
Mal. Hon. 5.	Islamic law and society

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75. Department of History. The following course structure is recommended.
(For details of the courses, see Appendix B):

Year I

Required Courses (27 credits) Credits

Hist. 11	Modern Southeast Asian History	3
Hist. 12	General East Asian History	6
Hist. 13	World History before 1500	6
Lang.	Malay I/Advanced Malay I	6
One of the following:		
Geo. 12	Elements of Human Geography	6
GPA. 11	Introduction to Government	6
Econ. 11	Economic Analysis I	6

Elective Courses (9 credits)

GPA. 12	Sociology I	6
GPA. 13	Introduction to Political Theory	6
Any course for Year I not already taken		3/6

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Year II

Required Courses (27 credits)

* Hist. 21	Early Southeast Asian History	3
OR		
* Hist. 22	Southeast Asian History, 16 th to 18 th centuries	3
* Hist. 23	Modern Chinese History	6
OR		
* Hist. 24	Europe in Early Modern Times	6
* Hist. 25	History of Modern Europe I	6
Hist. 26	History of Japan before 1868	6
Lang.	Malay II/Advanced Malay II	6

Elective Courses (9 credits)

Hist. 27	Modern South Asian History	3
Hist. 28	Chinese History (selected period)	3
Geo. 26	Geography of Southeast Asia	3
GPA. 21	The Malaysian Constitution	3
GPA. 22	Government and Politics of Southeast Asia	3
GPA. 23	Public Administration I	6
GPA. 25	Sociology II	6

Any course for Year II not already taken

3/6

Year III

Required Courses (24 credits)

* Hist. 31	History of Malaysia	6
* Hist. 32	History of Modern Japan	3
Hist. 33	Chinese History (selected period)	3
* Hist. 34	Theory & Method of History I	6
Hist. 35	History of the United States	6
OR		
Hist. 36	History of Russia	6
OR		
Hist. 37	History of Modern Africa	6

Elective Courses (12 credits)

Hist. 38	History of Indonesia and the Philippines	3
Hist. 39	History of Mainland Southeast Asia	3
Chin. 33	History of Chinese Philosophy	6
Geo. 34	Geography of Malaysia	6
GPA. 32	Public Administration II	6
GPA. 33	History of Political Thought	6
GPA. 34	Comparative Government	6
Econ. 33	History of Economic Thought	6

Honours Courses

Hist. Hons. 1.	Theory & Method of History II	6
—a long essay or academic exercise		

Hist. Hons. 2. History of East Asia (selected period)	6
Hist. Hons. 3. History of Modern Europe II	6
Hist. Hons. 4. Malaysian Historical Documents, 19 th and 20 th centuries	6
Hist. Hons. 5. Modern Political Thought since Hegel (may be given by Department of Government & Public Administration)	
Or One of the following if not already taken for the Pass degree:	
Hist. 35 History of the United States	
Hist. 36 History of Russia	
Hist. 37 History of Modern Africa	6

76. Department of Geography. The following course structure is recommended.

(For details of the courses, see Appendix B.):

Year I

Required Courses (27 credits)		Credits
Geo. 11	Elements of Physical Geography	6
Geo. 12	Elements of Human Geography	6
Geo. 13	Practical Geography	6
Geo. 14	Cartography	3
One of the following:		
GPA. 12	Sociology I	6
Econ. 11	Economic Analysis I	6
Bio. 1.1	Biology I	6
Elective Courses (9 credits)		
Hist. 11	Modern Southeast Asian History	3
Hist. 12	General East Asian History	6
Econ. 12	Statistics I	6
Lang.	Malay I/Advanced Malay I (for two years)	6
Any course above not already taken		6

Year II

Required Courses (27 credits)		
Geo. 21	Geomorphology I	6
Geo. 22	Climatology and Elementary Meteorology I	6
* Geo. 23	Economic Geography	6
* Geo. 24	Geography of Settlement	6
Geo. 25	Surveying and Map Projections	3
Elective Courses (9 credits)		
Geo. 26	Geography of Southeast Asia	3
Geo. 27	Geography of East Asia	3
Hist. 25	History of Modern Europe I	6
GPA. 22	Government of Politics of Southeast Asia	3
Lang.	Malay II/Advanced Malay II	6
Any course offered in Year I and Year II not already taken		3/6

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Year III

Required Courses (24 credits)

* Geo. 31	Geomorphology II	6
* Geo. 32	Climatology and Elementary Meteorology II	6
* Geo. 33	Modern Geographical Thought & Ideas	6
* Geo. 34	Geography of Malaysia	6

Elective Courses (12 credits)

At least one of the following:

Geo. 35	Political Geography	3
Geo. 36	Historical Geography	3
Geo. 37	Geography of South Asia	3
Hist. 31	History of Malaysia	6
GPA. 25	Sociology II	6
Econ. 21	Economic Analysis II	6
Econ. 22	Statistics II	6
GPA. 22	Government and Politics of Southeast Asia	3

Any course in Year II and Year III not already taken 3/6

Honours Course

Geo. Hons. 1.	History of Geographical Thought and Ideas	6
Geo. Hons. 2.	Geographical Description of a local area or academic exercise on a selected Geographical topic	6
Geo. Hons. 3.	Geography of the Tropical World	6
Geo. Hons. 4.	Geography of the Western World	6
Geo. Hons. 5.	Political Geography of Asia	6

77. Department of Government and Public Administration. The following course structure is recommended:

Year I

Required Courses (27 credits)

GPA. 11	Introduction to Government	6
GPA. 12	Sociology I	6
GPA. 13	Introduction to Political Theory	6
Hist. 11	Modern Southeast Asian History	3
Econ. 11	Economic Analysis I	6

OR

Econ. 12	Statistics I	6
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Elective Courses (9 credits)

GPA. 14	Introduction to the study of English law	3
Hist. 12	General East Asian History	6
Geo. 12	Elements of Human Geography	6
Lang.	Malay I/Advanced Malay I (for 2 years)	6

Any course above not already taken 6

Year II

Required Courses (27 credits)

* GPA. 21	The Malaysian Constitution	3
* GPA. 22	Government and Politics of Southeast Asia	6
GPA. 23	Public Administration I	6
GPA. 24	Elements of International Law	3
* GPA. 25	Sociology II	6
Econ. 21	Economic Analysis II	6
OR		
Econ. 22	Statistics II	6

Elective Courses (9 credits)

GPA. 26	Political Parties	3
Hist. 23	Modern Chinese History	6
Hist. 25	History of Modern Europe I	6
Hist. 26	Modern South Asian History	3
Geo. 23	Economic Geography	6
Geo. 26	Geography of Southeast Asia	3
Lang.	Malay II/Advanced Malay II	6

Any course of Year I and Year II not already taken 3/6

Year III

Required Courses (24 credits)

* GPA. 31	Comparative Constitution	6
* GPA. 32	Public Administration II	6
* GPA. 33	History of Political Thought	6
* GPA. 34	Comparative Government	6
OR		
IBM. 33	Labour Economics and Industrial Relations	6
OR		
Econ. 33	History of Economic Thought	6

Elective Courses (12 credits)

* GPA. 35	International Organisations	3
Hist. 31	History of Malaysia	6
Geo. 34	Geography of Malaysia	6
Econ. 24	International Economics I	6
Econ. 31	Economic Development	3
IBM. 22	Financial Institutions	6

Any course for Year II and Year III not already taken 3/6

Honours Courses

GPA. Hons. 1.	Academic exercise on Theory & Practice of Government	6
GPA. Hons. 2.	Field work on Public Administration in Malaysia — A report to be examined	6
GPA. Hons. 3.	Government and Politics in Malaysia	6
GPA. Hons. 4.	Modern Political Thought since Hegel	6
GPA. Hons. 5.	Constitutional History of Britain and the Commonwealth	6

CHAPTER SEVEN: Recommendations on the College of Science

78. We recommend that the College of Science be reorganised with the following departments:

- (a) Department of Mathematics
- (b) Department of Chemistry
- (c) Department of Physics
- (d) Department of Biology

79. It is not necessary to establish divisions within departments as at present. Each department, however, may develop more than one stream of study. In the Department of Biology, we have recommended a course structure which provides for a Botany stream and a Zoology stream. Other departments may also institute additional streams of study when necessary and when adequate staff is available.

80. The present courses of study in the Department of Chemical Engineering are not satisfactory at all. There are no proper mechanical workshop facilities in support of chemical engineering. Moreover, at present moment the demand for chemical engineers is very limited in this country. We strongly feel that the field be best left to the Faculty of Engineering at the University of Malaya where courses in other engineering practices have already been established. We therefore recommend that the Department of Chemical Engineering be abolished and that the present resources of equipment and staff be made available to strengthen the Department of Chemistry.

81. We recommend the following degree structure for the College of Science:

New Degree Structure — College of Science

Year	Pass Degree ¹ (Three years) Credits	Pass Degree ² (Four years) Credits	Pass Degree ³ (Two years) Credits	Minimum Total Credits
I	24(12)	21(6)	Exemption	24
II	27(9)	21(6)	27(9)	45
III	27(9)	18(9)	27(9)	66
IV	Honours courses	18(9)	Honours courses	87
V	—	—	—	108

1. Or any other suitable variations over 3 years.

2. Or any other suitable variations over 4 years.

3. Or any other suitable variations over 2 years.

82. We recommend that the courses be divided into two parts. In the first part, the courses provide a comprehensive survey of various subjects. In the second part, a

wider range of courses are provided to be covered in at least two years. Examinations for all the courses in Part II should be moderated by External Examiners.

83. The courses in the first part are arranged so that a student may, at the end of the courses, transfer from one Department to another, always provided he has taken the required courses of the Department concerned. In this way, a student is given the opportunity to make up his mind about his future career in the University.

84. A student of exceptional merit may be exempted from all the courses in Part I. He should then be permitted to complete all his courses for the pass degree in two years. As for students who are unable to obtain all the required credits within three years, they may do so in four years. No student may take more than five years to complete all the required courses for the pass degree.

85. We recommend the use of lectures as the normal means of teaching. Each lecture should be carefully prepared to bring out clearly and simply the most important aspects of a subject. Lectures should be used to introduce a topic sufficiently so that the students could do their own reading profitably. Tutorial/seminar classes may be used in support of lectures for further discussion on the topics covered as well as for discussion on the students' written assignments and exercises. Practical classes are essential; the organisation and supervision of laboratory classes must be the responsibility of senior staff.

86. Courses are assigned credits on the basis of one credit representing one hour of lecture or tutorial/seminar or two hours of practical classes per week for one semester. All courses are divided into three-credit and six-credit courses. We recommend that no student be allowed to register for courses exceeding a total of twenty-four credits in any one semester. For the courses in the Honours year, each course is approximately the same as a three-credit course.

87. Science students who in our local conditions must of necessity rely on works in the English Language for the pursuit of their study should be encouraged to use English in essay writing, laboratory reports and in the examinations. They should also be given every opportunity to improve their standard of English so that they have no difficulty in reading the latest publications by the time they are admitted to the honours classes. Students should take the appropriate courses offered by the Language Centre and make full use of the facilities provided by the Centre.

88. The credit system is particularly suitable for introducing special elective courses to cover the full range of each subject. We have merely suggested some of the possibilities for the degree structure. We suggest that the various Departments take full advantage of the system when they are adequately staffed.

89. We are particularly concerned not to lay down rigid limits for the honours courses. Details of such courses have been deliberately left out so that the staff responsible for introducing the courses may be free to design them appropriately.

90. **Department of Mathematics.** The following course structure is recommended.
(For details of the courses, see Appendix C):

Year I

Required Courses (24 credits)		Credits
Maths. 1.1	Algebra, Trigonometry, Calculus and Numerical Analysis	6
Maths. 1.2	Geometry, Statistics and Mechanics	6
Phy. 1.1	New Physics, Electricity & Magnetism	6
Phy. 1.2	General Physics, Optics, Heat and Sound	6
Elective Courses (12 credits)		
Chem. 1.1	General Chemistry	6
Chem. 1.2	Inorganic & Organic Chemistry	6
Bio. 1.1	General Biology I	6
Bio. 1.2	General Biology II	6

Year II

Required Courses (27 credits)		
Maths. 2.1	Algebra	3
Maths. 2.2	Probability & Statistics	3
Maths. 2.3	Calculus	3
Maths. 2.4	Differential Equations & Vector Analysis	3
Maths. 2.5	Fundamentals of Mathematics	6
Maths. 2.6	Analytical & Vectorial Mechanics	3
Phy. 2.1	A.C. Theory	3
Or		
Phy. 2.2	Spectra, Physical and Geometrical Optics	3
Phy. 2.5	Practical classes, two 3-hour classes per week for one Semester	3

Elective Courses (9 credits)

Any other degree courses in Physics, Chemistry and Biology

Year III

Required Courses (27 credits)		
Maths. 3.1	Linear Algebra	3
Maths. 3.2	Analysis	3
Maths. 3.3	Differential Equations & Geometry	3
Maths. 3.4	Dynamics	3
Maths. 3.5	Statistics	3
Maths. 3.6	Potential Theory	3
Maths. 3.7	Theory of Numbers I	3
Phy. 2.3	Thermodynamics & Statistical Mechanics	3
Or		
Phy. 2.4	Properties of Matter, Classical and Theoretical	3
Phy. 2.5	Practical classes, two 3-hour classes per week for one Semester	3

Elective Courses (9 credits)

Any other degree courses in Physics, Chemistry and Biology including the following:

Maths. 3.8	Mathematical logic	3
Maths. 3.9	Mathematic Programming	3
Maths. 3.10	Theory of Numbers II	3
Maths. 3.11	Tensor and Riemannian Geometry	3

Honours Courses

Required Courses

Maths. 4.1	Modern Algebra (1 course)
Maths. 4.2	Analysis & Differential Equation (1 course)
Maths. 4.3	General Topology (2 courses)
Maths. 4.4	Advance Calculus (1 course)
Maths. 4.5	Electromagnetism & Special Relativity (1 course)

Elective Courses

6 courses to be selected from either groups, A, B or C below:

Group A

Maths. 4.6	Algebraic Topology (2 courses)
Maths. 4.7	Functional Analysis (2 courses)
Maths. 4.8	Modern Algebra (2 courses)
Maths. 4.9	Lattice Theory (2 courses)
Maths. 4.10	Theory of Numbers (2 courses)

Group B

Maths. 4.11	Analytical Dynamics (1 course)
Maths. 4.12	Quantum Mechanics I (1 course)
Maths. 4.13	Quantum Mechanics II (1 course)
Maths. 4.14	Statistical Mechanics (1 course)
Maths. 4.15	General Relativity (2 courses)
Maths. 4.16	Mechanics of Continuous Media (2 courses)

Group C

Maths. 4.17	Statistics & Probability (3 courses)
Maths. 4.18	Computers (3 courses)
Maths. 4.19	Practical work in Statistics (3 courses)

91. Department of Chemistry. The following course structure is recommended.
(For details of courses, see Appendix C.):

Year I

Required Courses (12 credits)

Chem. 1.1	General Chemistry	6
Chem. 1.2	Inorganic & Organic Chemistry	6

Elective Courses (24 credits)

Phy. 1.1	New Physics, Electricity & Magnetism	6
Phy. 1.2	General Physics, Heat, Optics & Sound	6
Bio. 1.1	General Biology I	6
Bio. 1.2	General Biology II	6
Maths. 1.1	Algebra, Trigonometry, Calculus & Numerical Analysis	6
Maths. 1.2	Geometry, Statistics & Mechanics	6

Year II

Required Courses (30 credits)

Chem. 2.1	Inorganic Chemistry	6
Chem. 2.2	Physical Chemistry A	3
Chem. 2.3	Physical Chemistry B	3
Chem. 2.4	Organic Chemistry	6
Maths. 2.2	Probability and Statistics	3
Maths. 2.3	Calculus	3
Phy. 2.2	Spectra, Physical & Geometrical Optics	3
Phy. 2.3	Heat, Thermodynamics and Statistical Mechanics	3

Elective Courses (6 credits)

Any other degree courses in Physics, Mathematics and Biology

Year III

Required Courses (27 credits)

Chem. 3.1	Inorganic Chemistry	6
Chem. 3.2	Physical Chemistry A	3
Chem. 3.3	Physical Chemistry B	6
Chem. 3.4	Organic Chemistry A	3
Chem. 3.5	Organic Chemistry B	6
Chem. 3.6	Biochemistry	3

Elective Courses (9 credits)

Any other degree courses in Physics, Mathematics or Biology including the following:

Chem. 3.7 Industrial Chemistry

Honours Courses

The following courses will be covered over the year; practical classes will also be held:

1. Inorganic

Crystallography

Organometallic Chemistry

π -complexes, carbonyls and nitrosyls

Electron deficient compounds (boron hydrides)

Non-aqueous solvents

Inorganic Polymers

Nuclear chemistry

Ion exchange

Non-stoichiometric compounds

2. Physical

1. Spectroscopy

The course would include the consideration of the various types of spectroscopy such as ultraviolet, visible, infra-red, Raman, microwave, radiowave and mass. Study will be made as to show the interaction of matter with electromagnetic radiation could yield valuable information to the chemist.

2. Dielectrics
Theory of dipole moments; experimental determination and application to problems of chemical interest.
3. Statistical Thermodynamics
Internal rotation; Chemical equilibria; Theory of absolute reaction rates.
4. Radiation Chemistry
5. Colloids
6. Free radicals
7. Reaction rates
3. Physical Organic
 1. Correlation of Structure and reactivity of organic compounds.
 2. More detailed treatment of mechanism of:
 - (a) Heterolytic or polar reactions.
 - (b) Hemolytic or free radical reactions.
 3. Application of U.V., I.R. and N.M.R. in organic chemistry.
4. Organic
 1. Further discussion of Heterocyclic Compounds.
 2. Natural Products: alkaloids, diterpenes, sesquiterpenes, steroids, flavonoids, nucleic acids, tropolones.
 3. Chemistry of:
 - (a) non-benzenoid aromatics
 - (b) fulvenes
 - (c) carbenes

92. **Department of Physics.** The following course structure is recommended (For details of courses, see Appendix C.):

Year I

Required Courses (24 credits)		Credits
Phy. 1.1	New Physics, Electricity & Magnetism	6
Phy. 1.2	General Physics, Optics, Heat & Sound	6
Maths. 1.1	Algebra, Trigonometry, Calculus & Numerical Analysis	6
Maths. 1.2	Geometry, Statistics & Mechanics	6
Elective Course (12 credits)		
Chem. 1.1	General Chemistry	6
Chem. 1.2	Inorganic and Organic Chemistry	6
Bio. 1.1	General Biology I	6
Bio. 1.2	General Biology II	6

Year II

Required Courses (27 credits)		
Phy. 2.1	A.C. Theory	3
Phy. 2.2	Spectra, Physical & Geometrical, Optics	3

Phy. 2.3	Heat, Thermodynamics & Statistical Mechanics	3
Phy. 2.4	Properties of Matter, Classical and Theoretical Mechanics	3
Phy. 2.5	Practical classes, two 3-hour classes per week of two semesters	6
Maths. 2.2	Probability & Statistics	3
Maths. 2.3	Calculus	3
Maths. 2.4	Vector Analysis and Differential Equations	3

Elective Courses (9 credits)

Any other degree courses in Chemistry, Mathematics and Biology

Year III

Required Courses (27 credits)

Phy. 3.1	Electromagnetic Theory	3
Phy. 3.2	Nuclear Physics & Special Relativity	3
Phy. 3.3	Quantum Mechanics	3
Phy. 3.4	Electronics	3
Phy. 3.5	Practical, two 3-hour classes per week for two semesters	6
Maths. 3.5	Statistics	3
Chem. 2.1	Inorganic Chemistry	6

Elective Courses (9 credits)

Any other degree courses in Chemistry, Mathematics and Biology

HONOURS COURSES

Required Courses

Phy. 4.1	Quantum Mechanics
Phy. 4.2	Electromagnetism
Phy. 4.3	Nuclear Theory
Phy. 4.4	Spectroscopy
Phy. 4.5	Advance Experiment (I), 2 days per week for 5 weeks
Phy. 4.6	Advance Experiment (II), 2 days per week for 5 weeks

Elective Courses

Four courses to be taken at least 2 must be specialist courses.

Phy. 4.7	Specialist Course I
Phy. 4.8	Specialist Course II
Phy. 4.9	Specialist Course III
Phy. 4.10	Specialist Course IV
Phy. 4.11	Specialist Course V
Phy. 4.12	Specialist Course VI
Phy. 4.13	Advance Experiment III — 2 days per week for 5 weeks
Phy. 4.14	Advance Experiment IV — 2 days per week for 5 weeks

Advance experiments can be selected from about 12 different sets of experiments designed for the Honours Laboratory. Specialist courses will be given by members of staff on subjects closely related to their research interest. Classes in workshop practice, glass blowing and electronic circuitry work will be held during the first Semester and the vacation.

93. Department of Biology. The following course structure is recommended. In years II and III, two specialised streams of Botany and Zoology are offered. (For details of courses, see Appendix C.):

Year I

Required Courses (24 credits)		Credits
Bio. 1.1	General Biology I	6
Bio. 1.2	General Biology II	6
Chem. 1.1	General Chemistry	6
Chem. 1.2	Inorganic and Organic Chemistry	6
Elective Courses (12 credits)		
Phy. 1.1	New Physics, Electricity & Magnetism	6
Phy. 1.2	General Physics, Heat, Optics and Sound	6
Maths. 1.1	Algebra, Trigonometry, Calculus & Numerical Analysis	6
Maths. 1.2	Geometry, Statistics and Mechanics	6

Year II BOTANY

Required Courses (27 credits)		
Bio. 2.1	Cytogenetics	3
Bio. 2.2	Ecology and Biogeography (Plant)	3
Bio. 2.3	Taxonomy of seed-bearing plants	6
Bio. 2.4	Cryptogamic Botany	6
Bio. 2.5	Economic Zoology	6
Chem. 3.6	Biochemistry	3

Elective Courses (9 credits)

Any other degree courses in Mathematics, Physics, Chemistry or Zoology including the following:

Bio. 2.6	Horticulture	3
Bio. 2.7	History of Biology	3

Year II ZOOLOGY

Required Courses (27 credits)		
Bio. 2.1	Cytogenetic	3
Bio. 2.2	Ecology & Biogeography (Plant)	3
Bio. 2.8	Invertebrate Zoology	6
Bio. 2.9	Vertebrate Zoology	6
Chem. 3.6	Biochemistry	3
Bio. 2.10	Economic Botany	6

Elective Courses (9 credits)

Any other degree courses in Mathematics, Physics, Chemistry or Botany including the following:

Bio. 2.6	Horticulture	3
Bio. 2.7	History of Biology	3

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Year III BOTANY

Required Courses (27 credits)

Bio. 3.1	Plant Anatomy and Histology (with microtechniques)	6
Bio. 3.2	Palaeontology and Evolution	3
Bio. 3.3	Ecology and Biogeography (Animal)	3
Bio. 3.4	Mycology and Plant Pathology	6
Bio. 3.5	Plant Physiology	6
Maths. 2.2	Probability and Statistics	3

Elective Courses (9 credits)

Any other degree courses in Mathematics, Physics, Chemistry or Zoology including the following:

Bio. 3.6	Bacteriology	3
Bio. 3.7	15 Biological Essays (required for admission to Honours) to be taken over two Semesters	3

Year III ZOOLOGY

Required Courses (27 credits)

Bio. 3.2	Palaeontology & Evolution	3
Bio. 3.3	Ecology and Biogeography (Animal)	3
Bio. 3.8	Entomology	6
Bio. 3.9	Vertebrate History & Microtechniques	3
Bio. 3.10	Embryology	3
Bio. 3.11	Animal Physiology & Behaviour	6
Maths. 2.2	Probability and Statistics	3

Elective Courses (9 credits)

Any other degree courses in Mathematics, Physics, Chemistry or Botany including the following:

Bio. 3.12	Parasitology	3
Bio. 3.7	15 Biological Essays (required for admission to Honours) to be taken over two Semesters	3

Honours Courses

1. Students are expected to carry out an Investigation and write a report or academic exercise. The investigation need not be original work, but it must be carried out as if it were original work, and if it is founded on other work a copy of the relevant book or paper should be provided for the examiner.

2. Four courses in advanced practical ecology (Plant or Animal) in which four of the following habitats will be studied in detail:

Primary forest, secondary forest, mangrove forest, soil, fresh water sea beaches, coral reefs, open sea.

3. Two advanced courses in one of the following:

Cytology and Genetics	Horticulture & Market Gardening
Comparative Animal Physiology	Fisheries & Fishpond Culture
Plant Physiology	Entomology
Plant Pathology	

4. Two of the following courses (which must differ from 3 above):
 - (a) Any degree course not already taken, especially:

Bio. 3.12	Parasitology	Bio. 2.6	Horticulture
Bio. 3.6	Bacteriology	Bio. 2.7	History of Biology
 - (b) Advanced Microtechniques, Embryology, Applied Entomology, Mycology, Plant Taxonomy, Palaeontology, or other subjects as may be available.

CHAPTER EIGHT:

Recommendations on the College of Commerce

94. A brief survey of business education in the major countries of the English-speaking world has led us to the conclusion that:

- (a) Business education has an established place at the universities at both the undergraduate and post-graduate levels;
- (b) Important differences exist in the courses offered by the Commonwealth and the American universities;
- (c) The guiding principles in the development of professional courses are based on the culture, the educational patterns and the business needs of each country.

95. The College of Commerce at present consists of four departments offering specialization in Industrial Management, Accountancy, Banking and Finance, and Economics. We recommend that the existing Department of Industrial Management and Department of Banking and Finance be merged into one department to be called the Department of Industrial and Business Management. The College of Commerce will then comprise the following departments:

- (a) Department of Economics
- (b) Department of Accountancy
- (c) Department of Industrial and Business Management

96. We recommend the following degree structure for the College of Commerce:

New Degree Structure — College of Commerce

Year	Pass Degree ¹ (Three years) Credits	Pass Degree ² (Four years) Credits	Minimum Total Credits
I	30	27	18
II	39	27	36
III	39	27	60
IV	Honours Courses	27	84
V	—	—	108

1. Or any suitable variations over 3 years.

2. Or any suitable variations over 4 years.

97. A three-credit course consists of 30 one-hour lectures and 10-20 tutorials. A six-credit course consists of 40-60 one-hour lectures and 20-40 tutorials. Each honours course in Commerce is approximately the same as a six-credit course.

98. We recommend that the three Departments shall have common courses in the first year. Special emphasis should be placed on core subjects like, Economic Analysis I, Statistics I and Accounting I. By this arrangement, students completing the three courses will be in a better position to decide for themselves their future career in the University. After their first year, they should be allowed to transfer from one Department to another with the agreement of the Department concerned.

99. We recommend that each of the courses be examined by one three-hour paper. As for the honours examination, four to five three-hour papers are adequate. The graduation exercise shall constitute one paper for the purpose of marking, and the required length shall be between five thousand and ten thousand words. Topics for the exercise should be assigned to students not later than one month after the enrolment.

100. We are aware that management education is still very much in an experimental stage in many universities. There is always the need to take into account changing business requirements, new methods of teaching and other advances in the field. For this reason, we recommend that the courses of study be reviewed from time to time in the light of local developments and developments elsewhere.

101. In the context of Malaysia, where English is still the commercial and legal language, the importance of the language should not be overlooked. In addition, many reference books on business subjects which the students must consult frequently are written in English. Also it will be increasingly important for the students to know the National Language. We therefore recommend that the Language Centre establish a language laboratory for the College of Commerce to assist the students to acquire a good working knowledge of the necessary languages in the shortest possible time.

102. We feel that a commerce degree of a sufficiently high standard deserves the support of the professional bodies in Malaysia. This support may take the form of exemption from their intermediate examination and the usual reduction in the number of years of experience given to university graduates. This is particularly relevant to the degrees in accountancy. We suggest that the University authorities take up the question of recognition with the Singapore Society of Accountants and the Malaysian Association of Certified Public Accountants.

103. We further suggest that the College establish contacts with the commercial and industrial world to enable its commerce students to gain practical experience. The College should also provide courses or seminars during the long vacation. These courses or seminars may be offered in conjunction with outside bodies and institutions.

104. Department of Economics. The following course structure is recommended.
(For details of the courses, see Appendix D.):

Year I

Required Courses (24 credits)		Credits
Econ. 11	Economic Analysis I	6
Econ. 12	Statistics I	6
Acc. 11	Accounting I	6
Maths. 11	Mathematics I	6
Elective Courses (6 credits)		
Hist. 11	Modern Southeast Asian History	3
Geo. 12	Elements of Human Geography	6
GPA. 11	Introduction to Government	6
GPA. 12	Sociology I	6
GPA. 14	Introduction to the Study of English Law	3

Year II (39 credits)

Econ. 21	Economic Analysis II	6
Econ. 22	Statistics II	6
Econ. 23	Money & Banking	6
Econ. 24	International Economics I	6
Acc. 22	Accounting Theory & Analysis of Financial Data	3
IBM. 21	Principles of Management & Organisation	6
Acc. 35	Business Finance	6

Year III (39 credits)

* Econ. 31	Economic Development I	3
* Econ. 32	International Economics II	6
* Econ. 33	History of Economic Thought	6
* Econ. 34	Public Finance & Fiscal Policy	6
* Econ. 35	Agricultural Economics	6
* Econ. 36	National Income Accounting	6
* Econ. 37	Mathematical Economics	6

Honours Courses

1. Economic Development II
2. Economic Analysis III
3. Statistics III
4. Graduation Exercise
5. Mathematics II (Maths. 1.2)

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105. Department of Accountancy. The following course structure is recommended.
(For details of the courses, see Appendix D.):

Year I

Required Courses (24 credits)		Credits
Acc. 11	Accounting I	6
Econ. 11	Economic Analysis I	6
Econ. 12	Statistics I	6
Maths. 11	Mathematics I	6
Elective Courses (6 credits)		
Hist. 11	Modern Southeast Asia History	3
Geo. 12	Elements of Human Geography	6
GPA. 11	Introduction to Government	6
GPA. 12	Sociology I	6
GPA. 14	Introduction to the study of English Law	3

Year II (39 credits)

Acc. 21	Accounting II	6
Acc. 22	Accounting Theory & Analysis of Financial Data	3
Acc. 23	Commercial Law I	6
Econ. 21	Economic Analysis II	6
Econ. 22	Statistics II	6
Econ. 23	Money & Banking	6
IBM. 21	Principles of Management & Organisation	6

Year III (39 credits)

* Acc. 31	Accounting III	6
* Acc. 32	Commercial Law II	6
* Acc. 33	Auditing	6
* Acc. 34	Managerial Accounting	6
* Acc. 35	Business Finance	6
* Acc. 36	Taxation	6
* Econ. 31	Economic Development I	3

Honours Courses

1. Advanced Business Finance
2. Managerial Economics
3. Advanced Accounting Theory & Problems
4. Graduation Exercise
5. Mathematics II (Maths. 1.2)

106. Department of Industrial & Business Management. The following course structure is recommended. In Years II and III, two specialised streams of Industrial Management and of Banking and Finance are recommended. (For details of the courses, see Appendix D.):

Year I**Required Courses (24 credits)****Credits**

Acc. 11	Accounting I	6
Econ. 11	Economic Analysis I	6
Econ. 12	Statistics I	6
Acc. 11	Accounting I	6
Maths. 11	Mathematics I	6

Elective Courses (6 credits)

Hist. 11	Modern Southeast Asian History	3
Geo. 12	Elements of Human Geography	6
GPA. 11	Introduction to Government	6
GPA. 12	Sociology I	6
GPA. 14	Introduction to the study of English Law	3

Year II — Industrial Management (39 credits)

IBM. 21	Principles of Management & Organisation	6
IBM. 22	Factory Management	6
IBM. 23	Marketing I	6
Econ. 21	Economic Analysis II	6
Econ. 22	Statistics II	6
Econ. 23	Money and Banking	6
Acc. 22	Accounting Theory & Analysis of Financial Data	3

Year II — Banking & Finance (39 credits)

IBM. 21	Principles of Management & Organisation	6
IBM. 24	Financial Institutions	6
Econ. 21	Economic Analysis II	6
Econ. 22	Statistics II	6
Econ. 23	Money & Banking	6
Acc. 22	Accounting Theory & Analysis of Financial Data	3
Acc. 23	Commercial Law I	6

Year III — Industrial Management (39 credits)

* IBM. 31	Industrial Law	6
* IBM. 32	Marketing II	6
* IBM. 33	Labour Economics & Industrial Relations	6
* Econ. 31	Economic Development I	3
* Acc. 31	Accounting III	6
* Acc. 34	Managerial Accounting	6
* Acc. 35	Business Finance	6

Year III — Banking & Finance (39 credits)

* IBM. 34	Law & Practice of Banking	6
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* IBM. 35	Law & Administration of Trust	6
* Econ. 24	International Economics I	6
* Econ. 31	Economic Development I	6
* Econ. 34	Public Finance & Fiscal Policy	6
* Acc. 32	Commercial Law II	6
* Acc. 35	Business Finance	6

* Examination moderated by External Examiner.

Honours Courses (Industrial Management)

1. Personal Management
2. Production Management
3. Advanced Business Finance
4. Graduation Exercise
5. Mathematics II. (Maths. 1.2)

Honours Courses (Banking & Finance)

1. International Trade & its Finance
2. Trust Account & Taxation
3. Advanced Business Finance
4. Graduation Exercise
5. Mathematics II. (Maths. 1.2)

Note: All commerce honours students must take Mathematics II (Maths. 1.2) as a non-examination subject and attendance at lectures is compulsory.

CHAPTER NINE:

Implementation of the New Degree Structure

107. We believe that, with the implementation of the new degree structure, future graduates of the University should achieve standards comparable to graduates of other established universities. The task of implementation, however, must be undertaken with great care in order to ensure that the students receive the full benefits of the new curriculum.

108. We are convinced that the most important single factor for the successful implementation of the new degree structure is the selection of a strong Professorial Head for each of the Departments. We believe that the firm and dedicated leadership provided by such persons is the key to the new system. We recommend that every effort be made to find the best men available.

109. We recognise that there are many ways by which the new degree structure can be implemented. In considering all the alternatives, we concluded that with the present staffing difficulties, immediate implementation of all aspects of our recommendations will not be feasible. Partial stage-by-stage implementation also pose extremely complicated problems both in administration and in teaching. We feel that implementation cannot be tied to any rigid timetable. There must be the greatest flexibility.

We recommend that as many of the Pass degree courses in the new curriculum as possible be implemented with the staff available. This could begin with the new academic year in 1966/67, and, if possible, all remaining courses for the Pass degree be introduced in 1967/68.

110. We further recommend that a Standing Committee be established to guide the implementation of the new degree structure as long as it is needed to ensure the maintenance of the required standards. Because of the unevenness in the quality of the existing students, the immediate task of this Committee will be to supervise the transitional arrangements for these students to take suitable courses under the new degree structure. Particular care should be taken to see that the credits obtained by these students in the present four year structure be given the correct weight when allowing these students to fit themselves into the new three years degree structure.

111. We are aware that, during the first few years of the transition, there may be difficulty in ensuring that the desired standards are achieved. This difficulty can be overcome if the system of external examinations along the lines recommended is implemented immediately. It is imperative that the selected courses for moderation by External Examiners are organised satisfactorily. We are concerned that future graduates should be able to attain a standard suitable for further studies at the honours level. It is, therefore, important for External Examiners to be selected from among scholars familiar with the nature of honours degrees. Such External Examiners can then be expected to advise the University about the best means of introducing honours classes in a few years' time. Only when everyone concerned is satisfied that staff and students, equipment and facilities of the required quality are available should the University establish the first honours programmes. It is not suggested that every Department should start offering honours courses at the same time. The decision to have honours classes must depend on the conditions in the individual Department.

112. We feel that the significance of the new degree structure rests primarily on the quality of the honours degrees that the University will award. It is imperative therefore that the greatest care be made in the selection of graduates for admission to the honours classes.

113. We recognise that previous graduates of academic promise may wish to take the honours courses and recommend that provision be made to admit such graduates. We also recommend that such provision be made available to them for a period of five years only from the year the honours programmes are introduced.

114. For admission to the honours classes, first priority should be given to current graduates under the new degree structure. Other graduates are eligible to compete for places in the honours classes, but some priority should be given to those who were among the top 20% of their graduating classes.

CHAPTER TEN: Summary of Conclusions

115. We revised the curriculum and recommended a new degree structure consisting of a pass degree and an honours degree.

116. We believe that the University should open its doors to students from all streams of education in the country.

117. A Language Centre serving the whole University should be immediately established.

118. A Department of Malay Studies should be established in the College of Arts.

119. The Department of Modern Languages and Literature, the Department of Education, and the Department of Chemical Engineering should be abolished.

120. The Department of Political Science should be reorganised and renamed the Department of Government and Public Administration.

121. The Department of Industrial Management and the Department of Banking and Finance should be merged into one department called the Department of Industrial and Business Management.

122. The requirements of the relevant professional bodies must be kept in mind if courses in the College of Commerce are to be of an acceptable standard.

123. Staff of high academic quality must be obtained as soon as possible; it is particularly important that each Department should have a strong Professorial Head.

124. New salary scales should be immediately introduced in order to attract and retain good staff.

125. Opportunities and facilities for research must be adequately provided.

126. For future staff, facilities must be provided for the training of the University's own graduates. Plans should now be drawn up to offer higher degrees.

127. None of our recommendations concerning the new degree structure will be meaningful unless salary scales for teaching staff are revised and made comparable to those of other universities in Malaysia.