



Student Handbook

Diploma of Electronic Engineering

Intake: January 2024

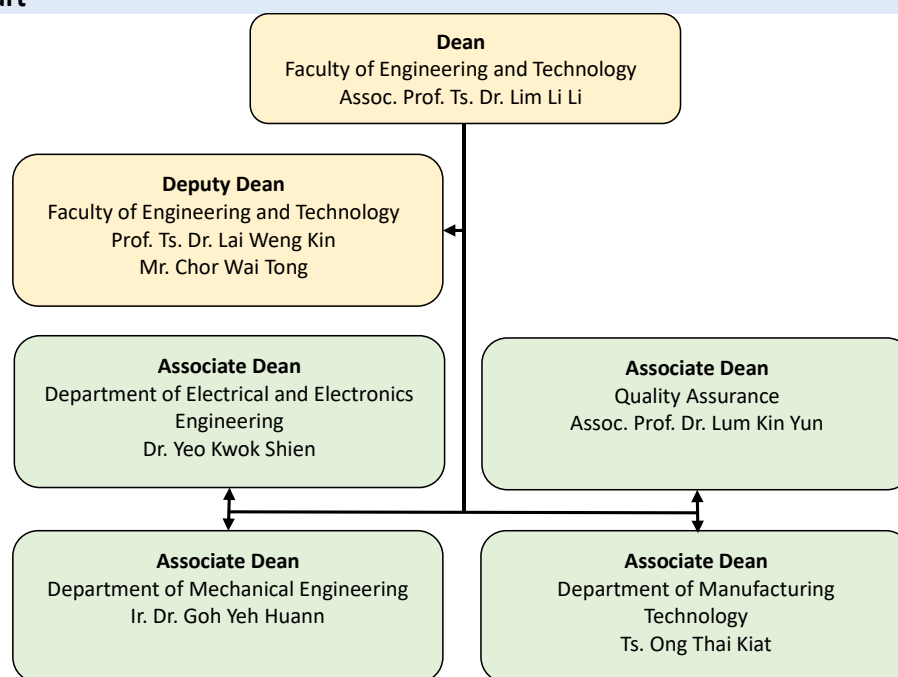
Compiled by:
Faculty of Engineering and Technology
Tunku Abdul Rahman University of Management and Technology,
Kuala Lumpur

General Information

1 Background of Faculty of Engineering

The Faculty of Engineering and Technology (FOET) began as the School of Technology (SOT) which was set up in 1972 to provide programmes that were designed and arranged such that students may sit for internationally recognised professional examinations or seek exemptions from such examinations, in particular the Board of Engineers Malaysia (BEM), and Engineering Council (EC). With the upgrading of Tunku Abdul Rahman University College (TARC) to Tunku Abdul Rahman University College (TAR UC), the School of Technology (SOT) is now known as the Faculty of Engineering and Technology (FOET). On 5 January 2023, TAR UC is upgraded to a full-fledged university, namely Tunku Abdul Rahman University of Management and Technology (TAR UMT). However, our aim has always been to BUILD YOUR DREAMS AND ENGINEER YOUR FUTURE, ensuring your dreams are fulfilled and your future secured.

2 Organization Chart



3 General Information

3.1 Important Information on Notice Board and Intranet

Students must read the important announcements and information on the notice board placed outside the FOET, Student Intranet, and TARC UC website. Such announcements and information may include notices on timetable, deadline for online repeat registration, printing of bills & payment, loan application, deadline of printing and payment of tuition fees, interview session for unsatisfactory attendance, etc. The onus is on the students to read these important announcements and information regularly.

3.2 Change of Address or Contact Number

It is the responsibility of the students to notify the office of the Faculty of any changes in their personal particulars, such as addresses or contact numbers so as to ensure their particulars in the Faculty database are accurate and up-to-date at all times. The Faculty will not be responsible or accountable for delayed, lost mail, or wrong information printed on official documents due to incorrect / obsolete students' addresses and contacts in the Faculty database. Application form for change of addresses or contact number can be obtained from the Faculty office. The completed form, duly filled in and signed, shall be submitted to the office of the Faculty whenever the changes occur.

3.3 Student Time Table

Students may download their time table from the Student Intranet at TAR UMT website.

3.4 Scheduled Classes

In order to help students get the most out of their education, subject to availability of resources, classes shall be arranged from 8am to 9pm **from** Monday to Saturday, except for Public Holidays. Attendance **in** all classes is mandatory. Exceptions may be made for extenuating circumstances, with applications submitted and prior approval obtained from the faculty. Refer to the Academic Regulations for Bachelor & Diploma Programmes 2023 in Student Intranet for more information.

3.5 Tutorial Group

Each student will be assigned to a tutorial group. Exchange of tutorial groups will not be permitted except under exceptional circumstances for which prior approval in writing must be obtained from the Associate Dean of the Department. Closing date for submission of Application for Changing of Tutorial Group is normally at the end of second week after the commencement of each semester. Late application will not be entertained.

3.6 Attendance (Lectures, Tutorials and Practical)

Students **MUST** register their attendance via TARCAApp using TAR UMT WiFi. Students are reminded that attendance is compulsory for all the scheduled classes. Please **DO NOT** take attendance on behalf of other students nor share the mobile pin code with other students if they are not present for the classes. This action will be deemed as academic misconduct. All students are expected to behave in a manner to uphold the principles for academic integrity. Any students found liable of academic misconduct shall be subjected to disciplinary actions. Refer to the Academic Regulations for Bachelor & Diploma Programmes 2023 in Student Intranet for more information.

3.7 Application for Leave of Absence

Students may apply for leave of absence through the Student Intranet. The total leave of absence shall not be more than **fourteen (14) days** within **one (1) academic year**. An application for leave of absence due to medical, compassionate reasons or emergency must be submitted with supporting documents through the student intranet within **three (3) days** from the date he/ she resumes his/ her study. For other reasons, an application for leave of absence, must be submitted with a written explanation and/or supporting documents at **least one (1) week** before the intended date of absence. The Faculty's decision to approve or reject any application for leave of absence shall be final.

3.8 Student Dialogue

The Faculty will conduct the Student Dialogue sessions with student representatives on programme matters twice in a 14-week semester, and once in a 7-week semester of each academic year.

3.9 Online Course Evaluation Survey

Towards the end of each semester, all students are required to complete the online course evaluation survey for all courses conducted.

3.10 Online Tracer Study

It is compulsory for all graduates to fill up the online tracer study as required by the Ministry of Education. For more information, please refer to Student Intranet at TAR UMT website.

3.11 Student Attire

Students shall dress appropriately and conform to the following guidelines:

a) Within campus except games and co-curricular activities:

- i. Collared shirts/T-shirt with sleeves and pants/jeans/skirt. No tattered attire is allowed, especially jeans.
- ii. Shirts (except Hawaiian-style shirt) should be tucked in.
- iii. Shorts are not allowed.
- iv. Female students should dress appropriately and modestly. Mini skirts / dresses, high slits or low necklines,

- v. “bare back” apparel and exposed midriff and spaghetti-straps or see-through blouses are not allowed.
- vi. Proper footwear, shoes/sandals shall be worn. Japanese slippers are not allowed.

b) Laboratory Attire

- i. Clothing that covers the upper body, arms, and entire leg to the ankle (e.g., pants, skirt, coveralls, lab coat)
- ii. which fully protects exposed skin.
- iii. Closed-toe shoes that resists rapid penetration by spilled liquids or sharps.
- iv. In laboratories where a fire danger is present, avoid clothing made of synthetic fibers. Wear less
- v. flammable natural fibers, such as wool, cotton, jute, flax, and silk.
- vi. Students must be equipped with appropriate personal protective equipment (PPE) relevant to each
- vii. laboratory. It is the responsibility of the students to observe and abide by the rules and regulations related to
- viii. laboratory operations.

c) For games and co-curricular activities:

- i. Proper sports attire (T-shirt, short/track bottom and sports shoes) should be worn at all times.

4 Evaluation and Assessment

4.1 Online Course Registration / Add and Drop Courses

Only ‘Active Status’ students are given the option to register for add and drop for main / elective course(s) of current semester or outstanding / resit / repeat course(s). The online course registration portal is accessible for students in the first week of each semester via <https://reg.tarc.edu.my/> on Student Intranet. After registration is done in the first week, students shall print the bill and make payment from the second week (Monday) to the fourth week (Monday). Please refer to notices issued by the Department of Examinations and Credit Accumulation on add and drop course(s) criteria, duration of online registration, printing and payment of bill before commencement of each new semester.

4.2 Assessment Components

Students shall be evaluated through the following components:

- a) Final examination; and/or
- b) Coursework which includes test, quiz, practical, project, report & case study; and/or
- c) Any other evaluation approved by TAR UMT.

4.3 Coursework Assessment

Coursework comprises of a combination of group and/or individual assignments, oral presentations, short tests, quizzes, laboratory experiment or practical reports, etc. The pass marks for coursework is 50%. All students must pass the coursework, failing which the students are required to repeat the course concerned.

4.4 Plagiarism

The Faculty views the plagiarism or collusion cases very seriously. These include, but not limited to, plagiarism or collusion in any part of their assignments, projects or written work, threaten the values of academic work and undermine the credibility and integrity of TAR UMT’s awards. Plagiarism or collusion will be dealt with appropriately by the Faculty. Such offenders shall appear before a panel of enquiry at the Faculty and appropriate punishment will be meted out. Punishment may include failing the students’ assignment or project, re-submission of another piece of work or downgrading of the work to the maximum of a pass grade.

Students are deemed to have signed a declaration that the work submitted, such as course work assignment, essays and projects, etc. is their own work and that they have not in any way knowingly allow another student to copy it. It will be assumed that all submitted work is that of the students’ own work.

Students are expected to familiarize themselves with or make use of method(s) of citing other people's work in accordance with acceptable referencing. The referencing system used in FOET is the Harvard Referencing System.

4.5 **Examinations**

Refer to Intranet under Examination for Notices (e.g. registration for Resit/ Repeat & co-curriculum); Information (e.g. examination regulation, awards, student discipline regulation) and other examination related matters.

4.6 **Malaysian University English Test (MUET)**

All Bachelor Degree students shall register and sit for MUET during the course of studying at TAR UMT. They must achieve a minimum MUET score of Band 3 prior to their graduation. MUET comprises of Speaking, Listening, Reading and Writing components. This test is conducted three (3) times in a year. Students are advised to visit Majlis Peperiksaan Malaysia (MPM) portal at www.mpm.edu.my for detailed information, MUET centres and registration for MUET.

TAR UMT's Centre for Continuing and Professional Education (CPE) will conduct the MUET preparatory course and MUET Seminar at prescribed fees for students. Students may contact CPE or refer to the TAR UMT website for further information.

5 Computer Services and Facilities

CIT Centre is situated in Cyber Centre, a three-storey building with a total built-up area of 100,000 square feet. It is designed to provide an ideal environment for student learning and social educational interaction. Seventeen (17) ICT laboratories and twenty one (21) discussion rooms are fully equipped with Internet connectivity to support training, e-learning, multimedia language learning, and a host of other teaching and learning activities (such as Microsoft and SPSS software). These laboratories, discussion rooms and the spacious atrium are furnished and designed to provide a conducive learning environment for students with different learning styles and preferences. The technology supported teaching environment caters for different teaching approaches and knowledge acquisition. This building houses a fast, reliable and comprehensive network infrastructure and various supporting utilities to enable effective and efficient development, operation, and maintenance of ICT facilities and services provided to all campuses.

The functions and services provided by CIT Centre are:

- a) Internet and Intranet Services
- b) Network, Hardware and Software Services
- c) Multimedia Services
- d) Teaching and Learning Technology Support

6 Bursary

6.1 **Payment of fees**

Fees payable for newly register students must be paid before or on the date stipulated in the Letter of Offer.

Thereafter, fees payable at the beginning of each semester, unless otherwise specified, must be paid within two (2) weeks from the date of the commencement of the semester, failing which the students shall be withdrawn without further notification. For withdrawal due to non-payment of fees, the withdrawal date shall be the commencement date of the semester.

Payment of fees can be made through the following:

- a) Any branches of Public Bank Berhad counters; or
- b) Public Bank internet banking (www.pbepbank.com); or
- c) TAR UMT Bursary Office (payment via Public Bank debit card, Public Bank credit card, bank draft, bank cheque (upon request), cash (upon request), money order or postal order only) in favour of "Kolej Universiti Tunku Abdul Rahman".

Notwithstanding the above, if a student faces financial problem and is unable to pay the tuition fees on time, they may be allowed to extend the payment of fees or pay by installment provided that the student has submitted a written explanation, a copy of student bill, and supporting documents to the office of the Faculty before the stipulated deadline stated in the Student Bills.

In the instance where the student is a Perbadanan Tabung Pendidikan Tinggi National (PTPTN) loan holder, and that there is a non-payment of tuition fees due to delay in banking of the loan into the student's account. The student must submit a completed Application Form for Extension of Payment to the Faculty office.

Payment after the due date of payment of fee shall be made via Public Bank debit card or in the form of bank draft only. A bank draft is not a receipt of payment made, it is a cash cheque purchased from the bank. The original bank draft should then be submitted to Bursary for payment.

6.2 Online Bill Printing and Semester Fee

Students shall print their students' bill on tuition fees through the Student Intranet. Students are advised to refer to Guidelines on Payment of Fees via TAR UMT homepage under Bursary.

<https://www.tarc.edu.my/bursary/index.jsp>

Payments of tuition fees must be made before or on the due date stated on the students' bill. Students who are in arrears of tuition fees after the due date shall be withdrawn without further notification. No payment of fee will be accepted by Bursary after the deadline of payment. Students who are still in arrears of fees are deemed to have left the University and their names will be deleted from the Register without further notification.

6.3 Facilities and Resources Fee

A relatively small amount of facilities & resources fees per student per academic year are charged to help the University to defray the large amount of annual expenditure incurred to provide well-equipped laboratories/workshops/facilities for students' learning. The commitment of these fixed expenses (e.g., licensing fees) are irrespective of the usage.

Refer here for definitions of other fees:

<https://www.tarc.edu.my/bursary/fees-glossary/>

6.4 Refund of Fees

For Newly Registered Student Who Withdraws:

Refer to Refund of Fees for Newly Registered Student via TAR UMT homepage under Bursary in:

<https://www.tarc.edu.my/bursary/refund-of-fees-for-newly-registered-student/>

Refund of Caution Money:

Subject to satisfactory conduct, caution money (less any liabilities) may only be refunded on application after a student has completed or withdrawn from his/her last programme of study at the University. The application for the refund should be made within one year from the date of completion or withdrawal from the University, failing which, the said caution money shall be transferred and contributed to TARC Education Foundation. Refer to the link below for more information.

<https://www.tarc.edu.my/bursary/application-for-refund-of-caution-money/>

For any further information/clarification, kindly contact Bursary at Tel: 603-41450123, ext.: 3417/3529/3284/3577/3648/3422/3469

6.5 Fees for Resit Examination and Repeating Courses

Upon online registration for Resit and/or Repeat course(s), students shall print two (2) copies of the bills via Student Intranet. The onus is on the students to print the Resit and/or Repeat bills and pay the fees before or by the stipulated deadline stated in the Resit and/or Repeat bills. As a guide, payment of resit and repeat bills shall be made by week 5 of the 14 lecture-week semesters or by week 3 of 7 the lecture-week semester.

No late Printing of Bills and Payment of Fees will be entertained. The Resit and/or Repeat fees will not be refunded even if the student is absent from the examination.

7 Financial Aid

Financial Aid is intended to help you finance your studies in TAR UMT when family and personal resources are not enough to meet your total education costs. The University provides a variety of scholarships, grants and study loans, some of which are administered by the Student Financial Aid Unit and others by external organizations. Financial aid offered to students may be merit-based, or subject to students' academic performance, family financial background and/or their participation in extracurricular activities.

You are advised to check the available financial aid at:

<https://www.tarc.edu.my/dsa/financial-aid/financial-aid/>

8 Library

The Library aims to provide library resources and services to support the teaching, learning and research needs of TAR UMT.

8.1 Academic Resources

The Library has a total collection of over 220,000 volumes of printed books, over 300 titles of print + online serials and 10,600 units of electronic/audio-visual materials. It also provides access to an extensive range of remotely accessible online resources; local and international databases, electronic journals, e-books and CCH nline publications.

Databases subscribed by the Library include ACM Digital Library, Ebrary, EBSCOhost Business Source Complete, Emerald, IOPScience, LawNet, Passport GMID, ProQuest Research Library and ProQuest Science Journals.

8.2 The Library caters for individual and collaborative work, with over 2,200 seats. Students have access to outstanding facilities for their academic work and study that include study carrels, individual study rooms, discussion rooms, reading rooms, audio visual room, Internet PCs, Wi-Fi access and many more.

The Library provides a number of services including loan services, reference services, self-service borrowing, user education programmes, interlibrary loan services, photocopying services, etc. Registered faculty, staff and students can search the library holdings, gain direct access to the full-text of electronic database and renew/reserve items at anytime, anywhere via Web OPAC (InfoWeb-Online Catalogue).

9 Student Services

9.1 Accommodations

Information on rooms available is regularly disseminated on notice boards maintained by DSA.

TAR UMT campus hostel accommodation is available and situated on a 6-acre land. It consists of 10 blocks of 5-storey building with 1,000 rooms which can accommodate 2,000 students. Hostel availability is based on first-come-first-served basis. Students may apply for the hostel only after receiving TAR UMT Offer Letter and having paid the full fees. Please visit the website of TAR UMT or contact DSA for more information about hostel accommodation.

Other than UC campus hostel, TAR UMT students are able to find accommodation in the nearby housing estates which are within easy reach of TAR UMT campus, such as:

- Taman Bunga Raya
- Jalan Genting Kelang
- Taman Desa Setapak
- Taman Sri Rampai
- Wangsa Maju
- Setapak Jaya
- Taman Melawati
- Setapak Indah
- Taman Melati
- Taman Danau Kota
- Wangsa Melawati

Students shall sign a tenancy-agreement with the landlord. It is important that the terms and conditions of the agreement should be clearly stipulated so as to avoid any misunderstanding. Copies of information sheets, “Guidelines on Tenancy Agreements” and “Sample of Tenancy Agreement” are available at the DSA upon request.

9.2 TAR UMT Campus Hostel Accommodation

TAR UMT campus hostel accommodation is available and situated on a 6-acre land. It consists of 10 blocks of 5-storey building with 1,000 rooms which can accommodate 2,000 students. Hostel availability is based on first-come-first-served basis. Students may apply for the hostel only after receiving TAR UMT Offer Letter and having paid the full fees. Please visit the website of TAR UMT or contact DSA for more information about hostel accommodation.

9.3 Sport and Recreation

The outdoor sports facilities available are:

- a) One sports field comprising one soccer pitch, jogging track and two netball courts
- b) One futsal court
- c) One handball court
- d) One dodgeball court
- e) Two volleyball courts
- f) Three basketball courts

9.4 Students’ Insurance Scheme

A ‘Student Personal Accident Insurance Scheme’ insures all students of TAR UMT. The policy will cover the students for accidents round the clock, anywhere in the world. The sum insured is RM60,000 for death or total disablement. In the event of death of the policy holder, funeral expenses not exceeding RM5,000 would also be paid.

In addition, students can also claim for medical treatment up to a maximum of RM5,000 and/or RM500 for traditional treatment per year (registered medical practitioners only) for injuries sustained in an accident. Copies of the Insurance Policy’s terms and conditions are available at the DSA for reference.

9.5 Student Counseling Services

A team of counselors is available to help students with emotional, personal or academic concerns through individual counseling sessions, group counseling sessions, workshops and seminars. The counselling services are strictly confidential. All individual and group counselling services are free of charge. Counselling services are available to students during office hours at the DSA.

9.6 Student Development and Career Services

Student Development and Career Services (SDCS) offers uniquely designed life programmes that are central to a student's personal and career growth. Some of SDCS specially crafted programmes are:

- a) "Your Leadership DNA" gives students the tools necessary to attain true leadership quality.
- b) "The Road to Excellence" has been designed to enhance students' resiliency and learning agility.
- c) ENACTUS TAR-UMT provides students a very unique platform to develop themselves by helping the communities that are in need.
- d) Career Development Workshops & Talks throughout the semester to help students to be aware of present-day industries' requirements. The career development workshops are conducted by counsellors, recruitment firms and professional organizations who would guide students in the identification of skills, interests, values and how to make appropriate career decisions with confidence and maximize their employability opportunities.

Some of the Career Talks or Workshops are:

- Company Talks
- Creating Your Future Workshop
- Personality, Goal Setting & Career Profiling Workshops
- Resume Writing & Interviewing Skills Workshops
- Leadership Camp
- Career Decision Making
- Career Fairs

9.7 Clubs, Societies and Committees

It is compulsory for students to join and participate in student academic society of the programme of study.

Advisors and Assistant Advisors will be appointed to guide and advise the students in the societies' activities.

Notwithstanding the above, students are strongly encouraged to join and participate in other clubs and committees for their personal development. Please refer to TAR UMT website (www.tarc.edu.my) for a complete list of clubs, societies and committees.

9.8 Study Abroad Unit (SAU)

The University has entered into various progression and articulation arrangements with universities overseas for both undergraduate and postgraduate studies. SAU provides you with useful information and the academic counselling to ensure you get the best out of your plans to study abroad. For further enquiries, students may visit the Study Abroad Unit (SAU) located at the Centre for Continuing and Professional Education (CPE Centre).

10 Programme/ Campus Transfer

A new student may apply for programme transfer at the beginning of the programme within the stipulated deadline. Applications for intra-faculty transfers (i.e., programme transfers within the faculty should be submitted to the FOET Office (Block M) whereas applications for inter-faculty transfers (i.e. programme transfers to other faculties) should be submitted to the Department of Admissions & Credit Evaluation (Ground Floor, Bangunan Tun Tan Siew Sin) within the stipulated deadline. The closing date for programme/ campus transfer is normally on the second Friday after commencement of lectures. Approval for the programme/ campus transfer is not guaranteed. Students whose transfers are successful are required to collect their transfer offer letter from FOET Office (for intra-faculty transfer) or Department of Admissions & Credit Evaluation (for inter-faculty transfer/ campus transfer). Students who have accepted the programme/ campus transfer will **NOT** be allowed to transfer back into their original programme/ campus of study after accepting the transfer through the payment of fees.

11 Miscellaneous

Students must note that upon registering as students of TAR UMT through payment of fees, they are to abide and comply with all the student code of conduct, rules and regulations of TAR UMT. These include payment of fees, attendance of classes, examinations, and comply with all rules. It is the responsibility of students to familiarize themselves with this code of conduct, rules and regulations. Any breach of the same may lead to disciplinary action.

Programme Outcomes Mapping

1 Introduction

Electronic engineering is an engineering discipline which uses the scientific knowledge of the behavior and effects of electrons to develop components, devices, systems, or equipment that uses electricity as part of its driving force. Electronic Engineering is a broad engineering field that encompasses many subfields including those that deal with power, instrumentation, telecommunications, consumer electronics, semiconductor circuit design, and many others.

Diploma of Electronic Engineering focus on applying concepts and skills to real world situations and the curriculum covers the following career enhancing courses: Digital and Analogue electronics, Communications, Automation and Control, Software engineering and Embedded controllers.

2 Programme Educational Objectives (PEO)

PEO1 Graduates are competent engineering technician practitioners in the field of Electronic engineering.

PEO2 Graduates are engaged in lifelong learning and professional development.

PEO3 Graduates are committed to professionalism in engineering technician practices and contribute to the society.

3 Programme Outcomes (PO)

PO1 Ability to acquire and apply Electronic engineering knowledge to wide practical procedures and practices

PO2 Ability to identify and analyse well-defined engineering problems using codified methods of analysis appropriate to Electronic engineering

PO3 Design solutions for well-defined technical problems and assist with the design of systems, components or processes with consideration to public health and safety, cultural, societal, and environmental considerations

PO4 Conduct investigations of well-defined problems, identifying relevant codes and catalogues, conduct standard tests and measurements

PO5 Apply appropriate techniques, resources, and modern tools to well defined engineering problems, with an awareness of the limitations

PO6 Demonstrate knowledge of the societal, health, safety, legal and cultural issues and its repercussions to engineering technician practice and solutions to well-defined engineering problems

PO7 Understand the sustainability and impact of engineering technician work in well-defined engineering problems in societal and environmental contexts

PO8 Understand and commit to professional ethics and responsibilities and norms of technician practice

PO9 Able to communicate effectively on well-defined engineering activities in both oral and written means with the engineering community and society

PO10 Function effectively as an individual, and as a member in diverse technical teams

PO11 Recognise the need for, and engage in independent updating in the context of specialised technical knowledge

PO12 Demonstrate knowledge and understanding of engineering management principles as a member or leader in a technical team within multidisciplinary environments

Year 1 Sem 1 (202401 Long)											
Course Code	Course Title	Credit Hrs	CW:EX	L	T	P	O	Type	Pre-req	Credit Bearing	CGPA Bearing
AJEL1523	INTEGRATIVE ENGLISH	3	100:0	0	28	0	0	Compulsory	nil	Y	Y
AGGE1053	C++ PROGRAMMING	3	50:50	28	0	42	0	Core	nil	Y	Y
AGGE1013	ENGINEERING TECHNICAL MATHEMATICS	3	20:80	28	21	0	0	Compulsory	nil	Y	Y
ATGE1083	MECHANICS	3	40:60	28	14	14	0	Core	nil	Y	Y
AGEL1513	INTRODUCTION TO ELECTRONICS	3	50:50	14	0	36	0	Core	nil	Y	Y
AGEL1523	PRINCIPLES OF ELECTRICAL AND ELECTRONIC ENGINEERING	3	50:50	14	0	27	0	Core	nil	Y	Y
Total:		18									

Year 1 Sem 2 (202405 Long)											
Course Code	Course Title	Credit Hrs	CW:EX	L	T	P	O	Type	Pre-req	Credit Bearing	CGPA Bearing
AJEL2513	PROGRESSIVE ENGLISH	3	100:0	0	28	0	0	Compulsory	NIL	Y	Y
AGGE1023	STATISTICS	3	20:80	28	21	0	0	Compulsory	nil	Y	Y
AGEL1533	ENGINEERING DRAWING & CADD	3	100:0	7	0	50	0	Core	Nil	Y	Y
ATGE1093	ENGINEERING PHYSICS	3	40:60	28	14	14	0	Core	Nil	Y	Y
AGEL1543	ELECTRONIC DEVICES	3	50:50	14	0	36	0	Core	Nil	Y	Y
AGEH1363	INTRODUCTION TO DIGITAL ELECTRONICS	3	50:50	14	0	28	0	Core	Nil	Y	Y
Total:		18									

Year 1 Sem 3 (202409 Short)											
Course Code	Course Title	Credit Hrs	CW:EX	L	T	P	O	Type	Pre-req	Credit Bearing	CGPA Bearing
AGGE1033	TRIGONOMETRY AND ALGEBRA	3	20:80	28	21	0	0	Compulsory	Nil	Y	Y
AGGE2033	CALCULUS	3	20:80	28	21	0	0	undefined	Nil	Y	Y
Total:		6									

Year 2 Sem 1 (202501 Long)											
Course Code	Course Title	Credit Hrs	CW:EX	L	T	P	O	Type	Pre-req	Credit Bearing	CGPA Bearing
AGEL2613	DIGITAL ELECTRONICS	3	50:50	14	0	28	0	Core	AGEH1363	Y	Y
AGEL2623	MICROPROCESSORS	3	50:50	14	7	30	0	Core	AGEH1363	Y	Y
AGEL2633	ELECTRICAL CIRCUIT THEOREM	3	50:50	28	0	14	0	Core	AGEL1523	Y	Y
AGEL2643	ANALOGUE ELECTRONICS	3	50:50	14	5	30	0	Core	AGEL1513	Y	Y
AGGE2422	ENGINEER AND SOCIETY	2	100:0	28	0	0	0	Core	Nil	Y	Y
AGEL3004_1	PROJECT	2	100:0	2	0	0	0	Core	Nil	Y	Y
AGGE2522	PROJECT MANAGEMENT AND FINANCE	2	50:50	28	0	0	0	Core	Nil	Y	Y
Total:		18									

Year 2 Sem 2 (202505 Long)											
Course Code	Course Title	Credit Hrs	CW:EX	L	T	P	O	Type	Pre-req	Credit Bearing	CGPA Bearing
AGEL2653	EMBEDDED SYSTEMS	3	50:50	14	0	42	0	Core	AGEL2623	Y	Y
AGEL2663	ELECTRICAL TECHNOLOGY AND CIRCUITS	3	40:60	28	0	14	0	Core	AGEL1523	Y	Y
AGEL2673	ELECTRONIC INSTRUMENTATION AND COMMUNICATIONS	3	40:60	24	0	24	0	Core	Nil	Y	Y
AGEL3004_2	PROJECT	2	100:0	2	0	0	0	Core	Nil	Y	Y
COCU	COCURRICULAR ACTIVITIES	2	100:0	0	0	0	0	Compulsory	Nil	Y	N
AGEL2683	INDUSTRIAL CONTROL AND AUTOMATION	3	50:50	28	0	14	0	Core	Nil	Y	Y
Total:		16									

Year 2 Sem 3 (202509 Short)											
Course Code	Course Title	Credit Hrs	CW:EX	L	T	P	O	Type	Pre-req	Credit Bearing	CGPA Bearing
AGEL2652	ENGINEERING PERSPECTIVES AND SKILLS	2	40:60	14	10	4	0	Core	Nil	Y	Y
MPU-2282	CIVIC CONSCIOUSNESS AND VOLUNTEERISM	2	100:0	0	14	0	0	Compulsory	Nil	Y	Y
Total:		4									

Year 3 Sem 1 (202601 Long)											
Course Code	Course Title	Credit Hrs	CW:EX	L	T	P	O	Type	Pre-req	Credit Bearing	CGPA Bearing
AGEL3908	INDUSTRIAL TRAINING	8	100:0	0	0	0	1	Core	Nil	Y	N
Total:		8									

Year 3 Sem 2 (202605 Long)											
Course Code	Course Title	Credit Hrs	CW:EX	L	T	P	O	Type	Pre-req	Credit Bearing	CGPA Bearing
MPU-2342	INTEGRITY AND ANTI-CORRUPTION	2	100:0	0	14	0	0	Compulsory	Nil	Y	Y
MPU-2173	PENGHAYATAN ETIKA DAN PERADABAN	3	100:0	0	14	0	0	Compulsory	Nil	Y	Y
Total:		5									

Total credit hours:93

*Students without SPM BM credit must opt for Bahasa Kebangsaan A, students with SPM BM credit will take MPU-2282 Civic Consciousness and Volunteerism. International Students to take Bahasa Melayu Komunikasi 1 instead of Pengajian Malaysia 2.



Course List

<u>Course Number</u>	<u>Course Code and Title</u>
1	AJEL1523 INTEGRATIVE ENGLISH
2	AGGE1053 C++ PROGRAMMING
3	AGGE1013 ENGINEERING TECHNICAL MATHEMATICS
4	ATGE1083 MECHANICS
5	AGEL1513 INTRODUCTION TO ELECTRONICS
6	AGEL1523 PRINCIPLES OF ELECTRICAL AND ELECTRONIC ENGINEERING
7	AJEL2513 PROGRESSIVE ENGLISH
8	AGGE1023 STATISTICS
9	AGEL1533 ENGINEERING DRAWING & CADD
10	ATGE1093 ENGINEERING PHYSICS
11	AGEL1543 ELECTRONIC DEVICES
12	AGEH1363 INTRODUCTION TO DIGITAL ELECTRONICS
13	AGGE1033 TRIGONOMETRY AND ALGEBRA
14	AGGE2033 CALCULUS
15	AGEL2613 DIGITAL ELECTRONICS
16	AGEL2623 MICROPROCESSORS
17	AGEL2633 ELECTRICAL CIRCUIT THEOREM
18	AGEL2643 ANALOGUE ELECTRONICS
19	AGGE2422 ENGINEER AND SOCIETY
20	AGEL3004_1 PROJECT I
21	AGGE2522 PROJECT MANAGEMENT AND FINANCE
22	AGEL2653 EMBEDDED SYSTEMS
23	AGEL2663 ELECTRICAL TECHNOLOGY AND CIRCUITS
24	AGEL2673 ELECTRONIC INSTRUMENTATION AND COMMUNICATIONS
25	AGEL3004_2 PROJECT II
26	COCU COCURRICULAR ACTIVITIES
27	AGEL2683 INDUSTRIAL CONTROL AND AUTOMATION
28	AGEL2652 ENGINEERING PERSPECTIVES AND SKILLS
29	MPU-2282 CIVIC CONSCIOUSNESS AND VOLUNTEERISM
30	AGEL3908 INDUSTRIAL TRAINING
31	MPU-2342 INTEGRITY AND ANTI-CORRUPTION
32	MPU-2173 PENGHAYATAN ETIKA DAN PERADABAN

1.	Name of Course :	INTEGRATIVE ENGLISH													
	Course Code :	AJEL1523													
2.	Synopsis :	This course will expose students to the fundamentals of listening, speaking and reading skills, as well as basic foundation in grammar and vocabulary to enhance their language proficiency and enable them to cope with their studies in English at tertiary level.(CEFR B1)													
3	Credit Value :	3													
4	Prerequisite/co-requisite: (if any)	nil													
5	Course Learning Outcomes (CLO) :														
	CLO1	Present themes, messages or main points based on selected videos. (A2, PLO9)													
	CLO2	Explain the use of grammar components in various texts. (A3, PLO9)													
	CLO3	Present personal views based on the content of selected articles. (A2, PLO9)													
6	Course Learning Outcomes (CLO)	Programme Learning Outcomes (PLO)													
		PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10	PLO11	PLO12		
	CLO 1									✓					
	CLO 2									✓					
	CLO 3									✓					
	7	Course Content Outline													
Grammar: - Subject Verb Agreement (SVA): - Agreement of Verb with Subject - Agreement of Verb with Determinative - Agreement of Verb with Collective and Uncountable Nouns - Agreement of Pronouns - Tenses: - Simple Present - Present Continuous - Simple Past - Past Continuous - Present Perfect - Past Perfect - Present Perfect Continuous - Past Perfect Continuous - Simple Future - Future Continuous - Future Perfect - Future Perfect Continuous - Parts of Speech - Prepositions - Adjectives - Adverbs - Phrasal Verbs - Modal Auxilliary Verbs - Collocations															

Listening and Speaking Skills:

- Orientating yourself to the text
- Predicting the situation
- Listening to understand context
- Listening for specific information
- Listening for contrasting ideas
- Listening for examples
- Listening for reasons and explanations
- Listening for cause and effect
- Distinguishing the relevant from the irrelevant information
- Predicting types of words needed
- Identifying main ideas
- Identifying details
- Understanding stress and intonation
- Identifying speaker's views, attitudes, and opinions
- Identifying facts and opinions
- Making inferences and drawing conclusions
- Following signpost words
- Using grammatically correct language
- Speaking with correct pronunciation
- Stress and intonation
- Fluency in speaking
- Using varied sentence structures

Reading and Vocabulary Skills:

- Skimming and scanning for main idea(s)
- Identifying details and examples to support an argument
- Making inferences and predictions based on information in the text
- Identifying the purpose of a paragraph or text
- Distinguishing fact from opinion
- Interpreting text for author's, intention, attitudes and style
- Inferring meaning from unfamiliar words
- Analysing prefixes and suffixes
- Deducing meaning from context
- Connotative meaning of words
- Denotative meaning of words
- Lexical meaning of words
- Semantic mapping of synonyms, antonyms and root words
- Recognising words related to a certain context (Vocabulary List)

Writing Skills

- Spelling and punctuation
- Writing simple sentences
- Introduction to different types of writing
- Paragraph Writing
- Components of Essay Writing

8	References (include required and further readings, and should be the most current)	<ol style="list-style-type: none"> 1. Gaudart,H., Hughes, R., Michael, J. & Yong, L.C. (2019). Towards Better English Grammar (3rd ed.). Oxford Fajar Sdn Bhd. 2. Stephenson, H., Dummett, P. & Hughes, J. (2019). Life Intermediate Student's Book (2nd ed.). Cengage Learning Singapore. 3. Barker, A. (2019). Improve Your Communication Skills: How to Build Trust, Be Heard and Communicate with Confidence (5th ed.). Kogan Page.
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1.	Name of Course :	C++ PROGRAMMING													
	Course Code :	AGGE1053													
2.	Synopsis :	Today, C++ programming language is widely used throughout the world in both academia and industry. It is a language of choice for business, engineering, and even real-time applications. In many educational institutions it is the language of choice for a first programming course.													
		This course will equip students with fundamental practical skills of developing and debugging computer programs. Students will be able to design computer program with optimized program control structure and data structure to solve practical engineering problems.													
3	Credit Value :	3													
4	Prerequisite/co-requisite: (if any)	nil													
5	Course Learning Outcomes (CLO) :														
	CLO1	Encode the devised solutions to simple computing problems into computer programs using integrated development environment (IDE). (P4)													
	CLO2	Write well-structured computer programs using control structures and functions. (C3)													
	CLO3	Implement arrays, pointers, file I/O and simple algorithms in computer programs. (C3)													
6	Course Learning Outcomes (CLO)	Programme Learning Outcomes (PLO)													
		PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10	PLO11	PLO12		
	CLO 1					✓									
	CLO 2	✓													
	CLO 3	✓													
	7	Course Content Outline													
Introduction: ?Brief history of computing and introduction to programming language. Familiarization with IDE: Introduction to the programs development processes Data types and variables ?Study of data types and variables, variable declarations, operators and expressions. Operators and expression: ?Arithmetic, relational, logical, assignment and other operators. ?Study of the various expressions used in conjunction with the operators. Tools used to document program logic: ?Flowchart ?Pseudo code Control Structure (Selection): ?Control structure statements and blocks such as IF statements, ELSE statements, MULTIPLE IF statements, SWITCH statements. Control Structure (Repetition): ?Control structure statements and blocks such as FOR loop, NESTED FOR loop. ?Control structure statements and blocks such as WHILE loop, DO WHILE loop.															

	<p>Functions:</p> <p>?Functions and program structure.</p> <p>?The syntax and concepts of using functions, parameter passing, external variables and the scope of the variables.</p> <p>?Make function call by value and by reference.</p> <p>?Use of standard header files and user defined header files.</p>		
	<p>Pointers and Arrays:</p> <p>?Study of one dimensional arrays and multi-dimensional arrays.</p> <p>?Passing array to function</p> <p>?Study of pointers and arrays.</p> <p>?Pointers and addresses.</p> <p>?Pointer arrays & Pointers to functions.</p> <p>Sorting and Searching Algorithm</p> <p>?Bubble sort (Sinking sort)</p> <p>?Selection Sort</p> <p>?Linear search / sequential search</p> <p>?Binary search</p>		
	<p>Advance Input and output:</p> <p>?Formatted file I/O access, Standard I/O</p>		
8	<table border="1"> <tr> <td data-bbox="105 718 690 1207"> <p>References (include required and further readings, and should be the most current)</p> </td><td data-bbox="690 718 1520 1207"> <p>Main references supporting the course</p> <ol style="list-style-type: none"> 1. Slobodan Dmitrovic, (2020), Modern C++ for Absolute Beginners, Apress 2. D. S. Malik, (2018), C++ Programming: Program Design Including Data Structures, 8th Edition, Cengage Learning <p>Additional references supporting the course</p> <ol style="list-style-type: none"> 1. P. J. Deitel, H. M. Deitel, (2017), C++: How to program, 10th Edition, Pearson 2. D. S. Malik, (2018), C++ programming: from problem analysis to program design, 8th Edition, Cengage Learning </td></tr> </table>	<p>References (include required and further readings, and should be the most current)</p>	<p>Main references supporting the course</p> <ol style="list-style-type: none"> 1. Slobodan Dmitrovic, (2020), Modern C++ for Absolute Beginners, Apress 2. D. S. Malik, (2018), C++ Programming: Program Design Including Data Structures, 8th Edition, Cengage Learning <p>Additional references supporting the course</p> <ol style="list-style-type: none"> 1. P. J. Deitel, H. M. Deitel, (2017), C++: How to program, 10th Edition, Pearson 2. D. S. Malik, (2018), C++ programming: from problem analysis to program design, 8th Edition, Cengage Learning
<p>References (include required and further readings, and should be the most current)</p>	<p>Main references supporting the course</p> <ol style="list-style-type: none"> 1. Slobodan Dmitrovic, (2020), Modern C++ for Absolute Beginners, Apress 2. D. S. Malik, (2018), C++ Programming: Program Design Including Data Structures, 8th Edition, Cengage Learning <p>Additional references supporting the course</p> <ol style="list-style-type: none"> 1. P. J. Deitel, H. M. Deitel, (2017), C++: How to program, 10th Edition, Pearson 2. D. S. Malik, (2018), C++ programming: from problem analysis to program design, 8th Edition, Cengage Learning 		

1.	Name of Course :	ENGINEERING TECHNICAL MATHEMATICS													
	Course Code :	AGGE1013													
2.	Synopsis :	This course is designed to enable student to understand the theories and principles of Mathematics. Course Objectives 1. To introduce students to fundamental concepts in Mathematics and understand their wide ranging applications. 2. To help students develop critical and abstract thinking abilities and apply them in solving problems.													
	Credit Value :	3													
4	Prerequisite/co-requisite: (if any)	nil													
5	Course Learning Outcomes (CLO) :														
	CLO1	Solve simple mathematical problems involving quadratic equations, series, coordinate geometry, functions, and trigonometry (C3)													
	CLO2	Apply fundamental operations in matrices, vectors, and Binomial expansion (C3)													
	CLO3	Solve rudimentary calculus concepts to elementary application. (C3)													
6	Course Learning Outcomes (CLO)	Programme Learning Outcomes (PLO)													
		PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10	PLO11	PLO12		
	CLO 1	✓													
	CLO 2	✓													
	CLO 3	✓													
	7	Course Content Outline													
Quadratics •the process of completing the square for a quadratic equation, •discriminant of a quadratic equation, •quadratic equations, •linear and quadratic inequalities, •simultaneous equations for a linear and a quadratic, •quadratic in some function of x.															
Functions •domain and range, •one-one function, inverse function and composite function, •relationship between the graphs of $y = f(x)$ and $y = f^{-1}(x)$, •relationships between the graphs of $y = f(x)$, $y = f(x) + a$, $y = af(x)$, $y = f(x + a)$, and $y = f(ax)$.															
Coordinate geometry •length, gradient and mid-point of a line segment, •equation of a straight line, •the gradients of parallel and perpendicular lines, •linear equations, •coordinates of a point of intersection.															
Trigonometry •graphs of the sine, cosine and tangent functions, •identities $\sin^2 \theta + \cos^2 \theta = 1$, •solutions of simple trigonometrically equations lying in a specified interval.															

	<p>Circular measure</p> <ul style="list-style-type: none"> •definition of a radian, and use the relationship between radians and degrees, •the arc length and sector area of a circle. <p>Series</p> <ul style="list-style-type: none"> •the general term of an arithmetic or a geometric progression, •the sum of the first n terms of an arithmetic or a geometric series, •the sum to infinity of a convergent geometric series, •problems involving arithmetic or geometric progressions. <p>Vectors</p> <ul style="list-style-type: none"> •operation on vectors, •unit vectors, displacement vectors and position vectors, •magnitude of a vector and the scalar product of two vectors, •the angle between two directions <p>Binomial expansions</p> <ul style="list-style-type: none"> •expansion of $(a + b)^n$ where n is a positive integer, •expansion of $(1 + x)^n$ where n is a rational number and $x < 1$, •binomial expansion for approximation. <p>Matrices</p> <ul style="list-style-type: none"> •the equality of two matrices, •operations for matrices with at most three rows and three columns, •inverses of 2×2 and 3×3 non-singular matrices, <p>Differentiation</p> <ul style="list-style-type: none"> •the idea of the gradient of a curve, •the differentiation notations, •the derivative of x^n together with constant multiples, sums and differences of functions, •the derivative of composite functions. <p>Application of Differentiation</p> <ul style="list-style-type: none"> •gradients, tangents and normal, •increasing and decreasing functions, •rates of change, stationary points. <p>Integration</p> <ul style="list-style-type: none"> •integration of $(ax + b)^n$, •evaluation of a constant of integration, •definite integrals, •the area of a region, •the volume of revolution about one of the axes. 	
8	<p>References (include required and further readings, and should be the most current)</p>	<p>Main references supporting the course</p> <ol style="list-style-type: none"> 1. Jean L. & Brian W., 2015, Oxford Pure Mathematics 1, Oxford University Press, UK. <p>Additional references supporting the course</p> <ol style="list-style-type: none"> 1. Goldie S, 2012, Pure Mathematics 1, Hodder Education, UK. 2. Bostock L, Chandler S, Jennings T, 2012. Pure Mathematics 1 for Cambridge International A Level, Nelson Thornes, UK. 3. Teh KS & Loh CY 2007, New Syllabus Additional Mathematics, 8th Edn, Shinglee Publishers, Singapore. 4. Teh KS, Lee YW & Tan AG 2012, STPM Text Mathematics T, Term 1, 1st Edn, Penerbitan Pelangi Sdn Bhd., Malaysia.

1.	Name of Course :	MECHANICS													
	Course Code :	ATGE1083													
2.	Synopsis :	This course covers the application of the law of motions, definitions of the relationships between force, work and energy. It also includes the application of pressure in physics of fluids.													
3	Credit Value :	3													
4	Prerequisite/co-requisite: (if any)	nil													
5	Course Learning Outcomes (CLO) :														
	CLO1	Apply basic principles of engineering mechanics in engineering problems. (C3)													
	CLO2	Use the basic laws of fluid science in fluid mechanics problems. (C3)													
	CLO3	Conduct experimental work with analytical judgement. (P3)													
6	Course Learning Outcomes (CLO)	Programme Learning Outcomes (PLO)													
		PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10	PLO11	PLO12		
	CLO 1	✓													
	CLO 2	✓													
	CLO 3					✓									
7	Course Content Outline														
Physical Science: Solid, liquids and gaseous, Mass density, Pressure, Pascal's Principle, Archimedes Principle, Bernoulli's equation ? Mass density ? Pressure ? Pascal's Principle ? Archimedes Principle ? Bernoulli's equation															
Mechanics-Kinematics: Displacement, speed, velocity and acceleration, Equations of motion, Free falling bodies, Projectile motion															
Mechanics-Circular motion: Uniform circular motion, Centripetal acceleration, Centripetal force, Satellites in circular orbits															
Mechanics-Rotational kinematics and dynamics: Angular displacement, angular velocity and angular acceleration, Equations of rotational kinematics, torque, Moment of inertia, Rigid object in equilibrium, Newton's second law from rotational motion, Rotational work and energy, Angular momentum															
Mechanics-Forces and Newton's Laws: Newton's Law of motion, Newton's Universal Gravitational Law, Type of forces: gravitational force, normal force and frictional forces															
Mechanics-Work and energy: Work done by constant force, Work-energy theorem and kinetic energy, Potential energy, Conservation of mechanical energy, Power															
Mechanics-Momentum and collisions: Momentum, Conservation of momentum, Collisions in 1-D and 2-D															
Mechanics-Simple harmonics motion (SHM): The ideal spring and SHM, SHM and the reference circle, The pendulum, Damped harmonic motion															

8	References (include required and further readings, and should be the most current)	<p>Main references supporting the course</p> <ol style="list-style-type: none"> 1. Hugh D. Young and Roger A. Freedman, (2020), Sears and Zemansky's University Physics with Modern Physics, 15th Edition, Pearson, Harlow, Essex <p>Additional references supporting the course</p> <ol style="list-style-type: none"> 1. David Young, Shane Stadler, (2019), Physics, 11th Edition, John Wiley & Sons Inc., Hoboken, New Jersey. 2. Raymond A. Serway, Chris Vuille, (2018), College Physics, 11th Edition, Cengage Learning, Boston
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1.	Name of Course :	INTRODUCTION TO ELECTRONICS													
	Course Code :	AGEL1513													
2.	Synopsis :	Basic Electronics provides the fundamental knowledge in the semiconductor theory which forms the building block of all electronic devices.													
3	Credit Value :	3													
4	Prerequisite/co-requisite: (if any)	nil													
5	Course Learning Outcomes (CLO) :														
	CLO1	Describe basic electronic circuit containing diodes. (C2)													
	CLO2	Analyze simple digital logic gates. (C4)													
	CLO3	Implement diode based circuit from system specification to final presentation in practical teams using computer aided analysis tool. (P3)													
6	Course Learning Outcomes (CLO)	Programme Learning Outcomes (PLO)													
		PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10	PLO11	PLO12		
	CLO 1	✓													
	CLO 2		✓												
	CLO 3					✓									
7	Course Content Outline														
	•Concepts of insulators, conductors, semiconductor materials,														
	•Atoms, Covalent bonds, conduction in semiconductor crystals, N-type and P-type semiconductor, PN junction, biasing the PN junction.														
	•Diodes and applications: PN junction diode, current-voltage (I-V) characteristic curve.														
	•Operation of diodes, ideal and practical diode models, half-wave rectifier, full-wave rectifier, bridge rectifier, rectifier filters.														
	•Diode limiting and clamping circuits, voltage multiplier circuits, diode data sheet.														
	•Special diodes: Device characteristics of Zener diodes, varactor diodes, optical diodes (LED) and Schottky diodes.														
	•Zener diode applications: voltage stabilization against varying supply voltage and loads, output resistance, regulation performance compare to an ideal voltage source. Examples of IC voltage regulators (7805, 7905, 7812), adjustable IC voltage regulators LM317. Introduction to logic circuits: Boolean algebra, AND, OR gates, truth tables, simple AND, OR circuit operations.														

8	References (include required and further readings, and should be the most current)	<p>Main references supporting the course</p> <ol style="list-style-type: none"> 1. Thomas L Floyd, 2017. Electronic devices: conventional current version, 10th Edition, Pearson Prentice Hall. 2. Sean Westcott, 2017. Basic Electronics: Theory and Practice, 2nd Edition, Mercury Learning & Information <p>Additional references supporting the course</p> <ol style="list-style-type: none"> 3. Theodore F. Bogart, Jeffrey S. Beasley and Guillermo Rico, (2004) Electronic Devices and Circuits, 6th Edition, Prentice Hall. 4. Thomas L. Floyd, (2004) Electronics Fundamentals: Circuits, Devices, and Applications, 6th Edition, Prentice Hall. 5. Ali Aminian, Marian K. Kazimierczuk, (2004) Electronic Devices: A Design Approach, Prentice Hall.
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1.	Name of Course :	PRINCIPLES OF ELECTRICAL AND ELECTRONIC ENGINEERING													
	Course Code :	AGEL1523													
2.	Synopsis :	Principles of Electrical and Electronics Engineering aims to provide students with a strong foundation of the basic principles of electrical and electronic circuits and systems, which are essential for further study in engineering technology and related fields.													
3	Credit Value :	3													
4	Prerequisite/co-requisite: (if any)	nil													
5	Course Learning Outcomes (CLO) :														
	CLO1	Apply basic electrical principles for resistive circuit measurements. (C3)													
	CLO2	Use suitable analysis methods to solve dc circuit problems. (C3)													
	CLO3	Use measuring instruments to test electrical circuits. (P3)													
	CLO4	Use CAD tools in circuit analysis. (P3)													
6	Course Learning Outcomes (CLO)	Programme Learning Outcomes (PLO)													
		PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10	PLO11	PLO12		
	CLO 1	✓													
	CLO 2	✓													
	CLO 3					✓									
	CLO 4					✓									
7	Course Content Outline														
Basic Electrical Systems															
•Electromotive Force and potential difference															
•Atomic structures															
•Charge and Current															
•Current flow convention															
•Ideal and practical voltage and current source															
Ohm's Law:															
•Ohm's Law and resistance															
•The relationship of current voltage and resistance															
•Insulators and conductors															
•Electrical safety															
Energy and Power															
•Energy and power															
•Power in an electric circuit															
•Resistor power ratings															
•Energy conversions and voltage drop in resistance.															

	<p>DC Series parallel Circuit</p> <ul style="list-style-type: none"> •Resistors in series •Current in an electric circuit •Total series resistance, •Ohm's law in series circuit •Voltage sources in series •Kirchhoff's voltage law •Voltage dividers •Power in a series circuit •Circuit ground <p>DC Parallel Circuit</p> <ul style="list-style-type: none"> •Resistors in parallel •Voltage in parallel circuits •Kirchhoff's current law •Total parallel resistance •Ohm's law in parallel circuits •Current sources in parallel •Current dividers •Power in parallel circuits 	
	<p>Circuit Theorems and Conversions</p> <ul style="list-style-type: none"> •The voltage source •The current source •Source conversions •The superposition theorem •Thevenin's theorem •Norton's theorem, •Maximum power transfer theorem, •Delta to wye and wye to delta conversions 	
	<p>Branch, Mesh and Node Analysis</p> <ul style="list-style-type: none"> •Branch current method •Mesh current method •Node voltage method 	
	<p>Basic Instrumentation</p> <ul style="list-style-type: none"> •Principles and application of electronic voltage meters •Moving- coil instrument •Multi-range voltmeter, ammeter and ohmmeter. 	
8	<p>References (include required and further readings, and should be the most current)</p>	<ol style="list-style-type: none"> 1. Thomas L. Floyd, David M. Buchla, Principles of Electric Circuits: Conventional Current Version,10th edition, Pearson (2021) 2. James S. Kang, Electric circuits, 1st edition, Cengage Learning (2018) 3. James A. Svoboda, Richard C. Dorf, Dorf's introduction to electric circuits, global edition, Wiley (2018)

1.	Name of Course :	PROGRESSIVE ENGLISH													
	Course Code :	AJEL2513													
2.	Synopsis :	This course is designed to help students to develop their spoken and written communication skills in English for the tertiary level in preparing them for the real world. (CEFR C1)													
3	Credit Value :	3													
4	Prerequisite/co-requisite: (if any)	NIL													
5	Course Learning Outcomes (CLO) :														
	CLO1	Demonstrate the use of correct sentence structures, grammar and vocabulary in written communication. (A3, PLO9)													
	CLO2	Respond persuasively and critically to job related questions in correct sentence structures, grammar and vocabulary. (A2,PLO9)													
	CLO3	Prepare a writing portfolio using the writing process approach. (A4, PLO9)													
6	Course Learning Outcomes (CLO)	Programme Learning Outcomes (PLO)													
		PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10	PLO11	PLO12		
	CLO 1									✓					
	CLO 2									✓					
	CLO 3									✓					
	7	Course Content Outline													
<p>Speaking Skill</p> <ul style="list-style-type: none">•Using appropriate adjectives to describe personalities during a job interview. (Proper Adjectives and Descriptive Adjectives: Regular and Predicate)•Using action verbs to describe job responsibilities.•Answering questions in a job interview using appropriate tenses. (Simple Past, Simple Present, Present Continuous and Simple Future) Using grammatical correct language for reporting.•Using varied sentence structures for a report.•Using passive and active sentences in a report.•Using appropriate verbal phrases to discuss issues critically. (participial phrase)•Using persuasive devices in a group discussion.• Language functions for group discussion															
<p>Listening Skill</p> <ul style="list-style-type: none">•Listening for specific information during a job interview.•Listen to understand context in a job interview•Revisiting subject verb agreement•Listening for specific information in a report.•Listening to understand context in a report.•Summarising information in a report.•Identifying adverbs in a report•Making predictions•Making inferences and drawing conclusions															

	<p>Reading and Vocabulary Skills</p> <ul style="list-style-type: none"> •Scanning for main ideas in a blog. •Inferring meaning of unfamiliar words in a blog. •Making inferences and predictions based on information in a blog. • Deducing meaning from context •Identifying details and examples to support an argument. •Scanning for main ideas in an email. •Inferring meaning (Vocabulary) of unfamiliar words in an email. •Making inferences based on information in an email.
	<p>Writing Skill</p> <ul style="list-style-type: none"> •Introducing reflective writing (Analytical practice where the writer describes an event/scene/thought and adds a personal reflection on its meaning) •Gathering information for writing purposes. •Planning an outline. •Using cohesive devices in report writing. •Presenting both sides of an issue in a feature article. •Revisiting sentence structures •Organising and developing ideas for email writing. •Applying appropriate English expressions in formal emails and letters. •Revisiting phrasal verb • Argumentative essay • Persuasive language in writing
8	<p>References (include required and further readings, and should be the most current)</p> <ol style="list-style-type: none"> 1. Dwyer, J. (2020). The Business Communication Handbook (11th ed.). Cengage Learning Australia. 2. Kolin P. C. (2022). Successful Writing at Work (11th ed.). Houghton Mifflin. 3. Filimowicz, M. & Tzankova, V. (2020). Reimagining Communication: Experience. Routledge. 4. Anderson,W., Beach, J. & Civin, A. (2019). A Guide to Academic and Professional Communication (2nd ed.), Edge Learning Media.

1.	Name of Course :	STATISTICS													
	Course Code :	AGGE1023													
2.	Synopsis :	Rationale for the inclusion of the course in the programme Statistics skill is considered one of the core skills of general education, and basic statistics should be taught to students in any programme of study. This course lays the foundation of statistical background necessary for further study in this or related subjects. Course Objectives 1. to enable students to solve problems logically 2. to enable students to display a situation statistically 3. to enable students to use appropriate statistic method for problem solving													
		Credit Value :	3												
4	Prerequisite/co-requisite: (if any)	nil													
5	Course Learning Outcomes (CLO) :														
	CLO1	Summarize and present data using descriptive statistical displays and measures. (C3)													
	CLO2	Solve probability, permutation and combination related problems. (C3)													
	CLO3	Apply the concept of probability to calculate the expected statistical parameters for discrete random variable and Binomial distribution. (C3)													
	CLO4	Apply basic calculus tools to calculate the expected statistical parameters for continuous random variable and Normal distribution. (C4)													
6	Course Learning Outcomes (CLO)	Programme Learning Outcomes (PLO)													
		PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10	PLO11	PLO12		
	CLO 1	✓													
	CLO 2	✓													
	CLO 3	✓													
	CLO 4	✓													
7	Course Content Outline														
	Representation of data •discrete, continuous, ungrouped, and grouped data •stemplots, boxplots, histograms, and cumulative frequency curves •symmetry and skewness in a data distribution. •mode •find median, range and interquartile range from cumulative frequency curves. •calculation to find mean and standard deviation.														
	Combination and permutations •permutations and combinations.														
	Probability •concepts of sample spaces, events, and probabilities •complementary events •exclusive and independent events •conditional probabilities														

	<p>Discrete Random Variable</p> <ul style="list-style-type: none"> •concept of a discrete random variable •probability distribution table •concept of the mathematical expectation •mean and variance of a discrete random variable 		
	<p>Binomial distributions</p> <ul style="list-style-type: none"> •formulae for probabilities for the Binomial distribution 		
	<p>Continuous random variable</p> <ul style="list-style-type: none"> •understand the concept of a probability density function, •use the relationship between the probability density function and the cumulative distribution function, •understand the concept of the mathematical expectation, •calculate the mean and variance of a continuous random variable, •solve problems which are modelled with appropriate probability density functions, 		
	<p>Normal distribution</p> <ul style="list-style-type: none"> •understand the normal distribution, •standardise a normal variable, •use normal distribution tables, •use the normal distribution as a model for solving problems, •use the normal distribution as an approximation to the binomial distribution, where appropriate. 		
8	<table border="1"> <tr> <td data-bbox="105 863 690 1350"> <p>References (include required and further readings, and should be the most current)</p> </td><td data-bbox="690 863 1521 1350"> <p>Main references supporting the course</p> <ol style="list-style-type: none"> 1. Mann, P.S., 2021, Introductory statistics, 10th ed., Wiley, Hoboken. 2. Bluman, AG, 2018, Elementary statistics: A step by step approach, 10th ed., McGraw-Hill, New York. <p>Additional references supporting the course</p> <ol style="list-style-type: none"> 1. Devore, 2016, Probability and Statistics for engineering and the sciences, 9th ed., Cengage Learning, Boston. 2. Weiss, N. A., 2016, Introductory statistics, 10th Ed. Pearson, Boston. </td></tr> </table>	<p>References (include required and further readings, and should be the most current)</p>	<p>Main references supporting the course</p> <ol style="list-style-type: none"> 1. Mann, P.S., 2021, Introductory statistics, 10th ed., Wiley, Hoboken. 2. Bluman, AG, 2018, Elementary statistics: A step by step approach, 10th ed., McGraw-Hill, New York. <p>Additional references supporting the course</p> <ol style="list-style-type: none"> 1. Devore, 2016, Probability and Statistics for engineering and the sciences, 9th ed., Cengage Learning, Boston. 2. Weiss, N. A., 2016, Introductory statistics, 10th Ed. Pearson, Boston.
<p>References (include required and further readings, and should be the most current)</p>	<p>Main references supporting the course</p> <ol style="list-style-type: none"> 1. Mann, P.S., 2021, Introductory statistics, 10th ed., Wiley, Hoboken. 2. Bluman, AG, 2018, Elementary statistics: A step by step approach, 10th ed., McGraw-Hill, New York. <p>Additional references supporting the course</p> <ol style="list-style-type: none"> 1. Devore, 2016, Probability and Statistics for engineering and the sciences, 9th ed., Cengage Learning, Boston. 2. Weiss, N. A., 2016, Introductory statistics, 10th Ed. Pearson, Boston. 		

1.	Name of Course :	ENGINEERING DRAWING & CADD													
	Course Code :	AGEL1533													
2.	Synopsis :	Rationale for the inclusion of the course in the programme Engineering drawing provides necessary engineering information. This course will equip the students with the ability to visualize and understand spatial relationships, and the competence to select and use appropriate graphical methods for representing design concepts which is inline with Programme Objective 1. Objectives: To provide students with knowledge in engineering drawing, and CAD tools that enable them to use imagination while observing different objects.													
3	Credit Value :	3													
4	Prerequisite/co-requisite: (if any)	Nil													
5	Course Learning Outcomes (CLO) :														
	CLO1	Draw engineering components manually with standard engineering convention. (C2,P4)													
	CLO2	Design basic engineering components and electronic circuit using CAD software. (C3,P4)													
	CLO3	Extract information from engineering drawings to perform necessary engineering task or decision making. (C3)													
6	Course Learning Outcomes (CLO)	Programme Learning Outcomes (PLO)													
		PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10	PLO11	PLO12		
	CLO 1					✓									
	CLO 2					✓									
	CLO 3					✓									
	7	Course Content Outline													
SECTION A: Engineering Drawing Introduction to engineering drawing Lettering, line work, reduced and enlarged scale Dimensioning and essentials of B.S.8888:2004 Units and use of standard symbols Geometrical Constructions															
SECTION B: AutoCAD Computer Aided Design Organisation of the AutoCAD screen Types of coordinate entries. (absolute, relative and polar) Initial settings for units, limits Coordinate system Icons															
SECTION C: PCB Design CAD Tool Introduction to PCB Design CAD Tool Schematic Capture															

SECTION A: Engineering Drawing

Orthographic Projection (first angle, third angle)
Sectional drawings-full sectioning and half sectioning

SECTION B: AutoCAD

Using draw/modiy toolbar
Creating and editing of points, lines, circles and arcs. Snap, grid and ortho modes. Object snap modes

SECTION C: PCB Design CAD Tool

Custom Schematic Libraries,
Custom Footprint Libraries.

SECTION A: Engineering Drawing

Sectional drawings-Offset sectioning and multi-view sectioning

SECTION B: AutoCAD

Using draw/modify toolbar
Creating and editing of points, lines, circles and arcs. Snap, grid and ortho modes. Object snap modes

SECTION C: PCB Design CAD Tool

Designing with custom libraries
PCB Layout Design

SECTION A: Engineering Drawing

Screw threads and screw-thread fasteners
Detail working drawings and assembly working drawings

SECTION B: AutoCAD

Using draw/modify toolbar
Creating and editing of points, lines, circles and arcs. Snap, grid and ortho modes. Object snap modes

SECTION C: PCB Design CAD Tool

PCB Layout Design

SECTION B: AutoCAD

Dimensioning & insert text
Layers

SECTION C: PCB Manufacturing

Develop PCB board and component insertion

SECTION B: AutoCAD

Block insert
Isometric grid

8	References (include required and further readings, and should be the most current)	<p>Main</p> <ol style="list-style-type: none"> 1. Gindis, E. J., Robert, C. K. (2018) Up and running with AutoCAD 2019: 2D Drafting and design, Academic Press, 9780128166239 2. Giesecke, F. E., Mitchell, A., Spencer, H. C., Hill, I. L. (2013), Proteus Design Suite: Getting Started guide, Labceter Electronics Ltd 3. Byrnes, D. (2011), AutoCAD 2012 for Dummies, Wiley <p>Additonal Reference</p> <ol style="list-style-type: none"> 1. Leach, J. A., (2010) AutoCAD 2010 Instructor: A Student guide to complete coverage of AutoCAD's commands and features, McGrawhill 2. Coombs, C. F. (2011), Coombs' printed circuits handbook. MacGraw Hill Professional. 3. Dygdon, J. T., Novak, J. E. (2009), Technical Drawing, 13th Edition. Pearson / Prentice Hall 4. Henzold, G. (2006) Geometrical dimensioning and tolerancing for design, manufactuing and inspection: a handbook for geometrical product specification using ISO and ASME standards, 2nd Ed, Elsevier, ISBN 9780080463780
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1.	Name of Course :	ENGINEERING PHYSICS													
	Course Code :	ATGE1093													
2.	Synopsis :	This course aims to provide students with the basic principles of physics in waves, optics, thermodynamics, modern and nuclear physics needed in the study and appreciation of engineering. Emphasis will be on the application of appropriate principles to solve engineering problems													
3	Credit Value :	3													
4	Prerequisite/co-requisite: (if any)	Nil													
5	Course Learning Outcomes (CLO) :														
	CLO1	Apply principles of physics in engineering problems. (C3,)													
	CLO2	Conduct experimental work with analytical judgement (P3)													
6	Course Learning Outcomes (CLO)	Programme Learning Outcomes (PLO)													
		PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10	PLO11	PLO12		
	CLO 1	✓													
	CLO 2					✓									
7	Course Content Outline														
	Waves: The nature of waves: longitudinal waves and transverse waves, Progressive and standing waves, Mathematical description of waves, Speed of waves in string														
	Waves-Sound waves: The nature of sound waves, Speed of sound, Sound intensity, Decibels, Doppler Effect														
	Waves-Waves properties: Reflection, Refraction, Principle of linear superposition, Constructive and destructive interference, Diffraction, Beats, Transverse standing waves (string), Longitudinal standing waves (column of air), harmonics of sound														
	Waves-Electromagnetic waves: The nature of electromagnetic waves, Electromagnetic spectrum, Speed of light, Polarization														
	Optics: Reflection, Image formed by spherical mirror: concave mirror & convex mirror, Mirror equation and magnification equation, Refraction: index of refraction, Snell's law, Total internal reflection, Formation of images by lenses: converging lens and diverging lens, Thin lens equation and magnification equation, Lenses in combination, Angular magnification and magnifying glass, Compound microscope and telescope														
	Atomics physics: Photoelectric effect, Nuclear, mass, atomic number and isotopes, a-particle scattering and nuclear atom, Line spectra: emission spectra & absorption spectra, Bohr's theory of Hydrogen atom, X-rays: X-ray diffraction														
Nuclear physics: Nuclear structure, Radioactivity, radioactive emission, Radioactive decay, activity, half-life and decay constant, Radioactive dating and decay series, Einstein relation: relation between mass and energy, Binding energy, Nuclear energy: nuclear fusion and nuclear fission															

	<p>Fundamental of Thermodynamics</p> <p>Temperature and heat: Temperature concept, Zeroth law of thermodynamics, Temperature coefficient of linear expansion, Heat capacity, Specific heat capacity, First law of thermodynamics: heat, internal energy and work, Thermodynamics processes: isobaric process, isothermal process, isochoric process and adiabatic process</p>		
	<p>Ideal gas law: The mole, Avogadro's number and molecular mass, Ideal gas law: Charles' Law, Boyle's Law, Perfect Gas Law</p>		
8	<table border="1"> <tr> <td data-bbox="105 409 690 869"> <p>References (include required and further readings, and should be the most current)</p> </td><td data-bbox="690 409 1510 869"> <p>Main references supporting the course</p> <p>1. Hugh D. Young and Roger A. Freedman, (2020), Sears and Zemansky's University Physics with Modern Physics, 15th Edition, Pearson, Harlow, Essex</p> <p>Additional references supporting the course</p> <p>1. David Young, Shane Stadler, (2019), Physics, 11th Edition, John Wiley & Sons Inc., Hoboken, New Jersey.</p> <p>2. Raymond A. Serway, Chris Vuille, (2018), College Physics, 11th Edition, Cengage Learning, Boston</p> </td></tr> </table>	<p>References (include required and further readings, and should be the most current)</p>	<p>Main references supporting the course</p> <p>1. Hugh D. Young and Roger A. Freedman, (2020), Sears and Zemansky's University Physics with Modern Physics, 15th Edition, Pearson, Harlow, Essex</p> <p>Additional references supporting the course</p> <p>1. David Young, Shane Stadler, (2019), Physics, 11th Edition, John Wiley & Sons Inc., Hoboken, New Jersey.</p> <p>2. Raymond A. Serway, Chris Vuille, (2018), College Physics, 11th Edition, Cengage Learning, Boston</p>
<p>References (include required and further readings, and should be the most current)</p>	<p>Main references supporting the course</p> <p>1. Hugh D. Young and Roger A. Freedman, (2020), Sears and Zemansky's University Physics with Modern Physics, 15th Edition, Pearson, Harlow, Essex</p> <p>Additional references supporting the course</p> <p>1. David Young, Shane Stadler, (2019), Physics, 11th Edition, John Wiley & Sons Inc., Hoboken, New Jersey.</p> <p>2. Raymond A. Serway, Chris Vuille, (2018), College Physics, 11th Edition, Cengage Learning, Boston</p>		

1.	Name of Course :	ELECTRONIC DEVICES													
	Course Code :	AGEL1543													
2.	Synopsis :	Electronic Devices equips students with the knowledge and skills in electronic devices and circuits for further understanding in the field of electronic engineering.													
3	Credit Value :	3													
4	Prerequisite/co-requisite: (if any)	Nil													
5	Course Learning Outcomes (CLO) :														
	CLO1	Describe the basics of single-stage transistor-based amplifiers (C2)													
	CLO2	Analyse simple digital logic gates. (C4)													
	CLO3	Implement transistor based circuit from system specification to final presentation in practical teams using computer aided analysis tool. (P3)													
	CLO4	Analyse field effect transistor amplifier circuits (C4)													
6	Course Learning Outcomes (CLO)	Programme Learning Outcomes (PLO)													
		PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10	PLO11	PLO12		
	CLO 1	✓													
	CLO 2		✓												
	CLO 3					✓									
	CLO 4		✓												
7	Course Content Outline														
Bipolar Junction Transistor															
• Transistor parameters and ratings. Transistor as a voltage amplifier. Transistor as a switch.															
• Transistor biasing: the DC operating point, base bias, emitter bias, voltage-divider bias.															
• Small signal Transistor amplifier: linear operating region, AC equivalent circuits based on h-parameters. Common-emitter, Common-collector and Common-base amplifiers.															
• Multi-stage amplifiers. (two cascading common emitter stages)															
Digital Logic Circuits															
• Introduction to logic circuits: Boolean algebra, NOT gates, truth tables, simple combinational circuits, simple DTL, NOT circuit operations, logic voltage levels (TTL)															
Field Effect Transistors															
• JFET-p-channel and n-channel structures, device operation, drain source characteristics. Biasing as an amplifier circuit. Equivalent circuits.															
• Depletion type and enhancement type, device action and characteristics, PMOS, NMOS, CMOS circuits. Circuit symbols, identification and testing, handling precautions.															
• MOSFET biasing and a simple amplifier circuits. CMOS logic circuits, inverter, OR, AND gates. Comparison of CMOS and TTL gates.															

8	References (include required and further readings, and should be the most current)	<p>Main references supporting the course</p> <ol style="list-style-type: none"> 1. Tomar G.S., Bagwari A., (2020). Fundamentals of Electronic Devices and Circuits (Algorithms for Intelligent Systems), Springer. 2. Alexander A., (2019). Digital Electronic Circuits - The Comprehensive View, World Scientific. <p>Additional references supporting the course</p> <ol style="list-style-type: none"> 3. Thomas L. Floyd, (2017). Electronic devices: conventional current version, 10th Edition, Pearson Prentice Hall. 4. Thomas L. Floyd, (2004) Electronics Fundamentals: Circuits, Devices, and Applications, 6th Edition, Prentice Hall. 5. Ali Aminian, Marian K. Kazimierczuk, (2004) Electronic Devices: A Design Approach, Prentice Hall.
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1.	Name of Course :	INTRODUCTION TO DIGITAL ELECTRONICS													
	Course Code :	AGEH1363													
2.	Synopsis :	The knowledge and analysis methods in Digital Electronics allow the design of specific digital circuits with minimum logic circuitry in order to reduce the complexity, errors and usage of electronic devices, thus enabling cost reduction. It also lays the fundamental knowledge for further studies in the fields of microprocessors, embedded systems and computer architecture.													
3	Credit Value :	3													
4	Prerequisite/co-requisite: (if any)	Nil													
5	Course Learning Outcomes (CLO) :														
	CLO1	Demonstrate understanding of Boolean algebra in analysing and simplifying complex logic circuits. (C3)													
	CLO2	Construct combinational logic circuits using discrete logic gates and simple MSI and LSI logic devices. (C3)													
	CLO3	Implement and troubleshoot combinational logic circuits using lab-based trainer kit. (P4)													
6	Course Learning Outcomes (CLO)	Programme Learning Outcomes (PLO)													
		PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10	PLO11	PLO12		
	CLO 1		✓												
	CLO 2			✓											
	CLO 3					✓									
	7	Course Content Outline													
Digital logic and technology: •The history of digital logic, digital circuit manufacturing: IC packaging, IC identification, example and brief explanation of digital logic families: DTL, TTL & CMOS. Logic Voltage Levels															
Numbering systems: •Binary, Octal, Decimal, Hexadecimal-Number base conversions, complements, signed Binary numbers. •Binary Arithmetic, Binary codes: Weighted-BCD-2421-5421-Gray code-Excess-3 code, ASCII conversion from one code to another.															
Boolean algebra: •Boolean logic operations, DeMorgan’s Theorem, •Logic gates AND, OR, NOT, NAND, NOR, EX-OR and EX-NOR. •Truth tables. Examples of logic gate devices and families. Data sheets.															
Designing combinational circuits: •Relating Boolean expressions to truth tables, SOP, POS logic representation. •Logic minimisation using Boolean algebra and Karnaugh maps (Max. 4 variables), equivalent logic representation. •Multiplexers, demultiplexers, internal architecture, design and simple application. •Problems specification relating to truth table.															
Design procedures: •Problems specification relating to truth table. Encoders, code converters, and case studies. Combinational logic circuit verification and test.															
Lab practical :Implement and troubleshoot combinational logic circuits using lab-based trainer kit.															

8	References (include required and further readings, and should be the most current)	<p>1.Ronald J. Tocci, Neal S. Widmer and Gregory L. Moss, Digital systems : principles and applications, 12th Edition, Pearson(2017)</p> <p>2.Roger L. Tokheim, Digital Electronics: Principles and Applications, 8th Edition, McGraw Hill (2013)</p> <p>Additional references supporting the course</p> <p>1.Thomas L. Floyd, Digital Fundamentals, 11th Edition, Pearson (2014)</p>
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1.	Name of Course :	TRIGONOMETRY AND ALGEBRA															
	Course Code :	AGGE1033															
2.	Synopsis :	This course is to equip students with knowledge of mathematical facts, concepts and techniques in solving mathematical problems. Course Objectives 1. To develop logical reasoning faculties and train students to recognise the connections between different areas or problems in Mathematics. 2. To provide basic mathematical skills in preparation for more advanced course at institutions of higher learning.															
3	Credit Value :	3															
4	Prerequisite/co-requisite: (if any)	Nil															
5	Course Learning Outcomes (CLO) :																
	CLO1	Construct rigorous mathematical arguments and proofs through use of precise statements. (C3)															
	CLO2	Use algebraic concepts to solve polynomial, exponential and logarithmic equations. (C3)															
	CLO3	Apply the concepts of trigonometry and vectors in problem solving. (C3)															
6	Course Learning Outcomes (CLO)	Programme Learning Outcomes (PLO)															
		PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10	PLO11	PLO12				
		CLO 1	✓														
		CLO 2	✓														
		CLO 3	✓														
7	Course Content Outline																
	Polynomials operations with polynomials the remainder theorem the factor theorem Partial fractions a polynomial of degree not more than 3, division by a linear or quadratic polynomial resulting with a quotient and a remainder (which may be zero) rational functions in partial fractions Inequalities inequalities of polynomials of degrees not more than three inequalities of rational functions Algebra the definition of $ x $ solutions of algebraic equations and inequalities $ a = b \Rightarrow a^2 = b^2$ and $ x - a < b \Rightarrow a - b < x < a + b$ Logarithms and exponents integral and rational exponents relationship between logarithms and exponents the laws of exponents and laws of logarithms and different bases equations and inequalities of exponents and logarithms																

	<p>Trigonometry</p> <p>the Law of Sines</p> <p>the Law of Cosines</p> <p>the area of a triangle</p> <p>equations in harmonic form</p> <p>knowledge of the secant, cosecant and cotangent, their relationship to cosine, sine and tangent</p> <p>simplification and exact evaluation of expressions</p> <p>selection of an identity or identities appropriate to the context of the equation : $\sec^2 \theta = 1 + \tan^2 \theta$ and $\operatorname{cosec}^2 \theta = 1 + \cot^2 \theta$, the expansions of $\sin (A \pm B)$, $\cos (A \pm B)$ and $\tan (A \pm B)$, the double angle formulae for $\sin 2A$, $\cos 2A$ and $\tan 2A$</p>
	<p>Vectors</p> <p>the significance of symbols in the equation of a straight line of the form $r = a + tb$</p> <p>types of lines: parallel, intersect or skew</p> <p>the angle between two lines, and the point of intersection of two lines if any</p> <p>the significance of symbols in the equation of a plane of the forms $ax + by + cz = d$ or $(r - a) \cdot n = 0$</p> <p>the line of intersection of two non-parallel planes</p> <p>the angle between two planes</p>
	<p>Complex numbers</p> <p>the idea of a complex number (real part, imaginary part, modulus, argument, and conjugate)</p> <p>equality of two complex numbers</p> <p>operations of two complex numbers</p> <p>representation of complex numbers in an Argand diagram</p> <p>multiplication and division of two complex numbers in polar form $r(\cos \theta + i \sin \theta) = re^{i\theta}$</p> <p>the two square roots of a complex number</p>
	<p>Complex numbers</p> <p>geometrical representations: conjugate of a complex number and of addition, subtraction, multiplication and division of two complex numbers</p> <p>loci and inequalities regions in the Argand diagram</p>
8	<p>References (include required and further readings, and should be the most current)</p> <div> <p>Main references supporting the course</p> <ol style="list-style-type: none"> 1. Michael Sullivan 2020, Algebra & trigonometry, 11th Edition, Hoboken, NJ : Pearson. <p>References supporting the course</p> <ol style="list-style-type: none"> 1. Goldie, S, 2018, Cambridge International AS and A Level Pure mathematics 2 & 3, 2nd edition Hodder Education, UK. 2. Tom Andrews, 2018, Cambridge international AS & A level mathematics : pure mathematics. 2 & 3, Student's book, London : Collins, UK 3. Judith A. Beecher, Judith A. Penna, Marvin L. Bittinger, 2016, Algebra & Trigonometry, 5th edition, Boston, MA : Pearson </div>

1.	Name of Course :	CALCULUS													
	Course Code :	AGGE2033													
2.	Synopsis :	This course is to equip students with mathematical techniques in the area of limit, derivative, integral and lay the foundation for further study of more advanced mathematical topics. Course Objectives 1. to equip students with knowledge of limits 2. to equip students the techniques of integration and differentiation 3. to provide students the abilities of applying appropriate techniques in problem solving													
	Credit Value :	3													
4	Prerequisite/co-requisite: (if any)	Nil													
5	Course Learning Outcomes (CLO) :														
	CLO1	Find the limit of a function and identify the existence of a limit. (C3)													
	CLO2	Find integrals using the various integral methods. (C3)													
	CLO3	Apply appropriate techniques to solve differentiation problems. (C3)													
6	Course Learning Outcomes (CLO)	Programme Learning Outcomes (PLO)													
		PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10	PLO11	PLO12		
	CLO 1	✓													
	CLO 2	✓													
	CLO 3	✓													
7	Course Content Outline														
	Limits														
	•the existence and the value of the left-hand limit, right-hand limit, or limit of a function														
	•the continuity of a function														
	Differentiation														
	•notations $f'(x)$, $f''(x)$, and														
	•derivatives of exponential, logarithmic and trigonometric functions														
	Differentiation														
	•differentiate products and quotients,														
	•use the first derivative of parametric or implicit functions														
•Higher-order differentiation															
Application of differentiation															
•gradients, tangents and normals															
•stationary points and sketching graphs															
Application of differentiation															
•approximate value for a root using the Newton-Raphson method															
•rate of change, minimum values, and maximum values															
Integration															
•integration of $kf(x)$ and $f(x) \pm g(x)$															
•integrate a rational function by means of decomposition into partial fractions															
Integration															
•use substitutions to obtain integrals															
•use integration by parts															

	<p>Integration</p> <ul style="list-style-type: none"> •definite integrals •approximate value by using the trapezium rule 	
	<p>Differential equations</p> <ul style="list-style-type: none"> •order and degree of a differential equation •the first order differential equation with separable variables 	
	<p>Differential equations</p> <ul style="list-style-type: none"> •the first order homogeneous differential equation •family of solution curves 	
	<p>Differential equations</p> <ul style="list-style-type: none"> •particular solution •problems that can be modelled by differential equation 	
	<p>Kinematics of Linear Motion:</p> <ul style="list-style-type: none"> •Displacement, Velocity and Acceleration as a Function of Time •Differentiation in Kinematics of Linear Motion •Integration in Kinematics of Linear Motion • Application of Kinematics of Linear Motion 	
	<p>Partial Differentiation</p> <p>?Function of several variables</p> <p>?Partial derivatives -first and second orders.</p> <p>?Chain Rule</p> <p>Applications to small errors. and rate of change</p>	
8	<p>References (include required and further readings, and should be the most current)</p>	<p>Main references supporting the course</p> <p>1. James Stewart; Daniel K. Clegg; Saleem Watson 2020, Calculus, 9th Edition, Cengage Learning, US.</p> <p>1.Stewart, J 2016, Calculus: Concepts and contexts, 8th edn, Cengage Learning, US.</p> <p>Additional references supporting the course</p> <p>1.Larson, R 2014, Calculus of a single variable, 10th edn, Cengage Learning, US.</p> <p>2.Stewart, J 2012, Single variable calculus, 7th edn, Thomson Brooks/Cole, US.</p>

1.	Name of Course :	DIGITAL ELECTRONICS													
	Course Code :	AGEL2613													
2.	Synopsis :	The knowledge of the course provides students with fundamental design techniques and circuit implementation skill in sequential logic systems. It also laid the fundamental knowledge for students in their further understanding in the field of microprocessors, embedded systems and computer architecture.													
3	Credit Value :	3													
4	Prerequisite/co-requisite: (if any)	AGEH1363													
5	Course Learning Outcomes (CLO) :														
	CLO1	Construct synchronous and asynchronous sequential circuits. (C3)													
	CLO2	Demonstrate understanding of memory devices and programmable logic devices (PLD) in digital logic circuit. (C3)													
	CLO3	Implement and troubleshoot sequential logic circuits using lab-based trainer kit. (P3)													
6	Course Learning Outcomes (CLO)	Programme Learning Outcomes (PLO)													
		PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10	PLO11	PLO12		
	CLO 1			✓											
	CLO 2		✓												
	CLO 3					✓									
7	Course Content Outline														
Flip-Flop •RS, JK, T, D flip-flops, clocked flip-flops, flip-flop integrated circuit features, flip-flop operation, transfer operation, shifting operation, counting operation, analysis of flip-flop circuits, timing diagrams.															
Sequential Circuits: •Shift registers, serial and parallel data transfer. •Counting circuits: Synchronous, asynchronous, binary 8421, decade, MOD-N, up-, down-, up/down, maximum counting frequency. •Function of Clocking circuits. •Case studies: Design of Synchronous counters: state diagram- State table, State assignment, Excitation table and maps, Circuit implementation.															
Introduction to digital system: •Elements of a digital system. •Example of digital systems: Calculators, Computers, data transmission systems, PLC, Microcontrollers. •Memory sub-systems, CPU memory connections. •ROM architecture, read/write timing, Applications, Flash memory. •RAM architecture, static RAM cell, read/write timing, expanding word size and capacity, incomplete address decoding. •Brief introduction to DRAM, characteristics and Technology. •Introduction to EPROM, EEPROM															
Introduction to Programmable Logic Devices (PLD): •PLD: PROM, PAL and PLA, internal architecture and combinational logic implementation.															

8	References (include required and further readings, and should be the most current)	<p>Main references supporting the course</p> <ol style="list-style-type: none"> 1. Ronald J. Tocci, Neal S. Widmer and Gregory L. Moss, Digital systems: principles and applications, 12th Edition, Pearson (2017) 2. Roger L. Tokheim, Digital Electronics: Principles and Applications, 9th Edition, McGraw Hill (2022) <p>Additional references supporting the course</p> <ol style="list-style-type: none"> 1. Thomas L. Floyd, Digital Fundamentals, 11th Edition, Pearson (2015)
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1.	Name of Course :	MICROPROCESSORS													
	Course Code :	AGEL2623													
2.	Synopsis :	As microprocessors are the key components in most of the modern electronics and communication systems, it is essential to equip the students with fundamental knowledge on its architecture, functionalities and software capabilities so that they are able to utilize microprocessors to process information and perform simple control on peripheral devices.													
3	Credit Value :	3													
4	Prerequisite/co-requisite: (if any)	AGEH1363													
5	Course Learning Outcomes (CLO) :														
	CLO1	Describe the architecture and operation of contemporary microprocessors. (C2)													
	CLO2	Interpret microprocessor specific programs written in assembly/C language by applying knowledge in software syntax and microprocessor architecture. (C3)													
	CLO3	Write simple microprocessor specific programs in assembly/C language. (C3)													
	CLO4	Simulate and test microprocessor specific programs using computer-aided tool. (P3)													
6	Course Learning Outcomes (CLO)	Programme Learning Outcomes (PLO)													
		PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10	PLO11	PLO12		
	CLO 1	✓													
	CLO 2		✓												
	CLO 3			✓											
	CLO 4					✓									
7	Course Content Outline														
Introduction: •Characterization and applications of microprocessors and microcontrollers. •Components and features of microcontrollers. • Von Neumann and Harvard architectures. •CISC and RISC architectures •Manufacturers of microprocessors and microcontrollers.															
Microprocessors architecture •Main characteristics: ALU & registers, machine cycle, instruction execution, oscillators, configuration bits. •Microcontroller families.															
Memory •Basic concept: logic organisation and types of memory. •Program memory. •Data memory: addressing & SFRs, EEPROM.															
Interrupts •Interrupt sources and associated registers. •Interrupt service subroutines.															
Introduction to IDE •Assembly language Elements: expression & operators, directives, program organisation. •Resources for programming the microcontroller: text editor, assembler, linker, library manager, simulator/debugger, programmer															

	<p>Programming the microprocessor</p> <ul style="list-style-type: none"> •Basic concepts: machine code and assembly language, structure of instruction, data addressing modes, stack. 		
	<p>Programming the microprocessor</p> <ul style="list-style-type: none"> •Instruction set for data transfer, arithmetic and logical operations, control transfer (conditional and unconditional branching, subroutine calls, return), bit manipulation and others. 		
	<p>Programming the microprocessor</p> <ul style="list-style-type: none"> •Developing a small microcontroller application in assembly code. 		
8	<table border="1"> <tr> <td data-bbox="103 384 691 779"> <p>References (include required and further readings, and should be the most current)</p> </td><td data-bbox="691 384 1513 779"> <p>Main references supporting the course</p> <ol style="list-style-type: none"> 1.Tam Hanna, Microcontroller Basics with PIC, Elektor International Media BV, 2020. 2.Martin Bates , PIC microcontrollers : an introduction to microelectronics , Elsevier/Newnes, 2011. <p>Additional references supporting the course</p> <ol style="list-style-type: none"> 1. John Crisp, Introduction to microprocessors and microcontrollers, Newnes, 2004 </td></tr> </table>	<p>References (include required and further readings, and should be the most current)</p>	<p>Main references supporting the course</p> <ol style="list-style-type: none"> 1.Tam Hanna, Microcontroller Basics with PIC, Elektor International Media BV, 2020. 2.Martin Bates , PIC microcontrollers : an introduction to microelectronics , Elsevier/Newnes, 2011. <p>Additional references supporting the course</p> <ol style="list-style-type: none"> 1. John Crisp, Introduction to microprocessors and microcontrollers, Newnes, 2004
<p>References (include required and further readings, and should be the most current)</p>	<p>Main references supporting the course</p> <ol style="list-style-type: none"> 1.Tam Hanna, Microcontroller Basics with PIC, Elektor International Media BV, 2020. 2.Martin Bates , PIC microcontrollers : an introduction to microelectronics , Elsevier/Newnes, 2011. <p>Additional references supporting the course</p> <ol style="list-style-type: none"> 1. John Crisp, Introduction to microprocessors and microcontrollers, Newnes, 2004 		

1.	Name of Course :	ELECTRICAL CIRCUIT THEOREM													
	Course Code :	AGEL2633													
2.	Synopsis :	The course aims to provide students with a strong foundation of the basic principles of electrical circuits and systems, which are essential for further study in electrical engineering technology and related fields.													
3	Credit Value :	3													
4	Prerequisite/co-requisite: (if any)	AGEL1523													
5	Course Learning Outcomes (CLO) :														
	CLO1	Apply basic electrical principles for inductive or capacitive circuit measurements. (C3)													
	CLO2	Analyse the response of linear order circuits. (C4)													
	CLO3	Perform measurement, testing and troubleshooting of electrical circuits. (P3)													
6	Course Learning Outcomes (CLO)	Programme Learning Outcomes (PLO)													
		PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10	PLO11	PLO12		
	CLO 1		✓												
	CLO 2		✓												
	CLO 3					✓									
7	Course Content Outline														
Electromagnetism and Inductors •The magnetic field •Electromagnetism •Field strength •Permeability •Magnetic hysteresis •Electromagnetic induction •Induced E.M.F.															
Inductors and Capacitor •Energy stored in inductor •The basic inductor •Types of inductors •Series inductors •Parallel inductors •Inductors in DC circuits •Inductors in AC circuits •The basic capacitor •Types of capacitors •Series capacitors •Parallel capacitors •Capacitors in DC circuits •Capacitors in AC circuits															

Alternating Current and Voltage

- Generation of alternating E.M.F.
- Sinusoidal voltage sources
- Voltage and current values of sine waves
- Angular measurement of a sine wave
- The sine wave formula
- Average and effective values
- Form factor
- Ohm's law and Kirchhoff's laws in AC circuits, Superimposed DC and AC voltages, Non-sinusoidal waveforms.

Introduction to R, L, C Elements

- Response of basic R, L, C element to a sinusoidal voltage or current
- Inductive and capacitive reactance, impedance, admittance, conductance, susceptance.
- Leading and lagging of current in R, L, C elements
- Frequency response plots of the R, L, C elements

Steady-State Single Phase AC

- Single phase AC Circuits. Resistance and Inductance (Capacitance) in series
- Phasor representation of voltage and current in AC circuits (Phase Angle)
- Voltage and current in parallel/series RL and RC circuits
- Expressing voltage, current and impedance in complex notation, rectangular form and polar form
- Frequency Response Plot of AC circuit
- Power in AC circuit

RLC Circuits

- RLC resonance, Q-factor

Bandwidth

- Active, reactive, apparent power factor
- Solution of simple network problems by phasor and complex number representations

Basic Electric Circuits

- Mesh and nodal analysis
- System response using differential equations
- First order circuits, transfer function in standard form

Advance Electric Circuits

- Transient and steady state response of first order circuit to unit step input, sinusoidal input

Industrial Electrical Diagrams

- Introduction to Industrial electrical diagrams
- Ladder diagrams, wiring diagrams, single-line diagrams, motor connections and terminology

8	References (include required and further readings, and should be the most current)	<p>Main references supporting the course</p> <ol style="list-style-type: none"> 1. Boylestad RL (2016), Introductory Circuit Analysis, 13th Edn, Pearson, New Jersey. 2. Alexander CK & Sadiku MNO (2021), Fundamentals of Electric Circuits, 7th Edn, McGraw Hill, New York. <p>Additional references supporting the course</p> <ol style="list-style-type: none"> 1. Wildi, T (2006), Electrical Machines, Drives and Power System, 6th Edn, Pearson / Prentice Hall, New Jersey. 2. Floyd, TL (2020), Principles of Electric Circuits: Conventional Current Version, 10th Edn, Pearson / Prentice Hall, New Jersey. 3. El-Hawary, ME (2002), Principles of Electric Machines with Power Electronic Applications, 2nd Edn, Wiley-IEEE Press, New Jersey.
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1.	Name of Course :	ANALOGUE ELECTRONICS													
	Course Code :	AGEL2643													
2.	Synopsis :	Analogue Electronic equips students with the knowledge and skills in electronic devices and circuits for their further understanding in the field of electronic engineering. Lallalal													
3	Credit Value :	3													
4	Prerequisite/co-requisite: (if any)	AGEL1513													
5	Course Learning Outcomes (CLO) :														
	CLO1	Analyse various classes of power amplifiers (C4)													
	CLO2	Analyse op-amp circuits based on the required design specifications (C4)													
	CLO3	Analyse different op-amp oscillator circuit configurations (C4)													
	CLO4	Implement amplifier circuit from system specification to final presentation in practical teams using computer aided analysis tool. (P3)													
6	Course Learning Outcomes (CLO)	Programme Learning Outcomes (PLO)													
		PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10	PLO11	PLO12		
	CLO 1	✓													
	CLO 2		✓												
	CLO 3		✓												
	CLO 4					✓									
	7	Course Content Outline													
Operational Amplifiers • Operational amplifier, ideal and non-ideal characteristics and modes of operations, inverting, non-inverting, voltage follower configurations. Applications, comparators, summing amplifiers, integrators, differentiators and difference amplifiers.															
Negative Feedback amplifier • Voltage-derived feedback, Effect of feedback on gain, distortion, frequency response, input and output impedance. Application to design of linear audio amplifier.															
Oscillator circuits and positive feedback • Causes of instability (oscillation) in negative feedback amplifiers. Barkhausen criterion and conditions necessary for sustain oscillation. Stability of frequency and amplitude of oscillation. • Design of RC ladder and Wien bridge phase shift oscillators, LC oscillators to meet frequency and amplitude specification. Brief introduction to simple crystal oscillator circuits.															

	<p>Power Amplifiers</p> <ul style="list-style-type: none"> • Small signal amplifiers H-parameter and r-parameter conversion. Effects of coupling and bypass capacitors. Low Frequency response of BJT amplifiers. Effects of transistor's internal capacitors. High frequency hybrid-π model. High Frequency response of BJT amplifiers. • Audio power amplifier design. Collector dissipation and thermal considerations. Class A, B and AB biasing. • Cross over distortion. Biasing requirement of a complementary emitter follower push-pull output stage. Output power and efficiency determination from load-line for Class A operation. Concept of matching for maximum power transfer to load / loudspeaker, tolerated power amplifiers specifications.
8	<p>References (include required and further readings, and should be the most current)</p> <p>Main references supporting the course</p> <ol style="list-style-type: none"> 1. Tomar G.S., Bagwari A., (2020). Fundamentals of Electronic Devices and Circuits (Algorithms for Intelligent Systems), Springer. 2. Thomas L Floyd, 2018. Electronic devices: conventional current version, 10th Edition, Pearson Prentice Hall. <p>Additional references supporting the course</p> <ol style="list-style-type: none"> 3. Thomas L. Floyd, (2017). Electronic devices: conventional current version, 10th Edition, Pearson Prentice Hall. 4. Thomas L. Floyd, (2004) Electronics Fundamentals: Circuits, Devices, and Applications, 6th Edition, Prentice Hall. 5. Ali Aminian, Marian K. Kazimierczuk, (2004) Electronic Devices: A Design Approach, Prentice Hall.

1.	Name of Course :	ENGINEER AND SOCIETY													
	Course Code :	AGGE2422													
2.	Synopsis :	The scope of an engineer has gone beyond the theoretical analysis and design into the holistic framework of integrating into society in general. It is therefore important for engineers to possess the skills and abilities to function as part of society, understand the impact of professional responsibilities and norms of engineering practice.													
		Objectives This course will provide students the awareness on impact of their action on the environment and society in various aspects including assess of societal, health, safety, legal and cultural issue. This course will also acquaint them with their working environment so that they can achieve a relatively easy transition from undergraduates to working engineers.													
3	Credit Value :	2													
4	Prerequisite/co-requisite: (if any)	Nil													
5	Course Learning Outcomes (CLO) :														
	CLO1	Discuss the roles and responsibilities, and principles of ethics of an Inspector of Work in relation to society and norms of engineering practice. (C3)													
	CLO2	Assess the impact of the technological developments and use of natural resources with appropriate consideration for societal, health, safety, legal, cultural and environmental factors. (C4)													
	CLO3	Discuss the principles and practices of sustainability development.(C3)													
	CLO4	Demonstrate the ability to work effectively in a workgroup. (A4)													
6	Course Learning Outcomes (CLO)	Programme Learning Outcomes (PLO)													
		PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10	PLO11	PLO12		
	CLO 1							✓							
	CLO 2						✓								
	CLO 3							✓							
	CLO 4										✓				
7	Course Content Outline														
	Inspector of Work's ethical considerations The need for a code of ethics, general provisions of such code, codification of ethical considerations in practice and in law, applicability of code of ethics in engineering practice.														
	Route to Inspector of Work registration and Professional Bodies Background, elements of approved scheme of academic learning, elements of industrial practice, legal requirements, consideration of the Washington Accord, bilateral and multilateral agreements on recognition of professional competency.														
	Technology and Society Definition of technology and the role of technology in providing capabilities to society, the response and change of society to new capabilities, the development of new technologies to achieve desired functionality, socio-technological systems, evaluation of new technology.														

	<p>Utilisation of natural resources Considerations in the use of key natural resources – population, consumption patterns, state of technology and social factors.</p> <p>Energy issues Need for energy, problems in the use of energy, approaches to resolving problem of depletion and of environmental effect, nuclear energy and hydrogen economy</p> <p>Major environmental impact Acid rain, global warming and the impact on society, approaches in resolving impact.</p> <p>Pollution and waste disposal Types, causes and the solution to problems of pollution and waste disposal.</p> <p>Mineral and miscellaneous raw material resources Mineral and raw material resources, utilisation, depletion and threats, impact on society, approaches in resolving depletion.</p> <p>Water and land use Economic and social impact of water availability and use</p> <p>Industrial and engineering safety Definition and determination of industrial/engineering safety, risk management and engineering safety analysis processes and tools, theories of accidents.</p> <p>Legal requirements Legal considerations in industrial safety and accident preventions, safety and health legislation, case studies of major industrial accidents and lessons learnt.</p> <p>CLO 5 may appear in any of the above CLOs</p>
8	<p>References (include required and further readings, and should be the most current)</p> <p>Main references supporting the course :</p> <ol style="list-style-type: none"> 1.Main references supporting the course 2.Masten S.J. and Davis M.L., (2020), Principles of Environmental Engineering and Science, 4th ed., McGrawHill 3.Dunlap, R.s. (2019) Sustainable Energy, 2nd ed., Cengage 4.Ho, X and Chuah, CK.,(2021), Staying Safe at Work, Sunway University Press <p>Additional references supporting the course</p> <ol style="list-style-type: none"> 1.Moaveni, S. (2018), Energy, Environment, and Sustainability, Cengage Learning 2.Sorensen, B., (2016), Renewable Energy, Physics, Engineering, Environmental Impacts, Economics and Planning, 5th ed., Academic Press

1.	Name of Course :	PROJECT I													
	Course Code :	AGEL3004_1													
2.	Synopsis :	In the increasing recognition of the importance of practical know-how in industry, engineering technology curriculum needs to be based on hands-on practical work. This course provides an opportunity for students to analyse and design using appropriate modern technology for systems with actual hardware implementation that involves consideration for public health and safety, cultural, societal, project management and environmental concerns. By incorporating practical design into the programme, the curriculum would enhance the skills of the students and equip them with practical knowledge to function with competencies and creativities in the engineering technology profession.													
3	Credit Value :	2													
4	Prerequisite/co-requisite: (if any)	Nil													
5	Course Learning Outcomes (CLO) :														
	CLO1	Conduct literature review required for the applied engineering problem. (A3)													
	CLO2	Analyze an applied engineering problem through appropriate codified methods. (C4)													
	CLO3	Design solutions for solving an applied engineering problem by incorporating considerations on public health and safety, society, environment and sustainability (C6)													
	CLO4	Evaluate health, safety, and legal issues on the project implementation. (C5)													
	CLO5	Evaluate the impact of engineering solutions in societal and environmental contexts and demonstrate knowledge of and need for sustainable development. (C5)													
	CLO6	Apply ethical principles and professional norms in solving an engineering problem. (A4)													
	CLO7	Apply logical troubleshooting procedures to solve problems. (P3)													
	CLO8	Use proper workshop tools, techniques and multimedia technologies for intended tasks. (P4)													
	CLO9	Practice proper project management skills with consideration on resource management. (C3)													
	CLO10	Present project deliverables effectively through oral and written modes. (A3)													
6	Course Learning Outcomes (CLO)	Programme Learning Outcomes (PLO)													
		PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10	PLO11	PLO12		
	CLO 1										✓				
	CLO 2		✓												
	CLO 3			✓											
	CLO 4					✓									
	CLO 5						✓								
	CLO 6							✓							
	CLO 7				✓										

7	CLO 8					✓								
	CLO 9											✓		
	CLO 10									✓				
	Course Content Outline													
8	Lectures on the following topics: - General briefing of project titles - Proposal and Report writing - Literature search													
	Project implementation													
	References (include required and further readings, and should be the most current)					Main references supporting the course: 1. Ranjit Kumar (2019), Research methodology : a step-by-step guide for beginners, 5th Edition, SAGE Publication. 2. Dipankar Deb, Rajeeb Dey, Valentina E. Balas (2019), Engineering Research Methodology: A Practical Insight for Researchers, Springer. Additional references supporting the course Nil								

1.	Name of Course :	PROJECT MANAGEMENT AND FINANCE													
	Course Code :	AGGE2522													
2.	Synopsis :	The scope of an engineer has gone beyond the theoretical analysis and design into the holistic framework of integrating into society in general. It is therefore important for engineers to possess the conceptual knowledge, skills and abilities to assess societal, health, safety, legal, cultural and environmental issues in handling project and be responsible to professional practice and function as part of society at large. The scope covers the roles of project management in work environment, tools and techniques used in different phase of the project life cycle and management of a project from conceptual idea to commercialization. Financial consideration in managing projects are the concerns too.													
3	Credit Value :	2													
4	Prerequisite/co-requisite: (if any)	Nil													
5	Course Learning Outcomes (CLO) :														
	CLO1	Describe project management processes and the knowledge areas using the PMBOK Guide. (C2)													
	CLO2	Apply common tools and techniques used in project management processes. (C3)													
	CLO3	Apply fundamental cost and finance concepts in project management (C3)													
	CLO4	Analyse a project of a case-based or a problem-based example. (C4)													
6	Course Learning Outcomes (CLO)	Programme Learning Outcomes (PLO)													
		PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10	PLO11	PLO12		
	CLO 1												✓		
	CLO 2												✓		
	CLO 3												✓		
	CLO 4												✓		
7	Course Content Outline														
Introduction to project management Definition and characteristics of projects, need for project management, project life-cycle. Project management area of knowledge and processes. Phases of projects: initiation, planning, execution, monitoring and closure. Role of project manager, project structures and composition of project team.															
Project charter, project scope and work breakdown structure															
Network diagram and project scheduling. Network diagramming techniques, Gantt charts for scheduling Introduction to project management software.															

	<p>Project Monitoring and Control</p> <p>Purpose of control, types of control processes, balance in a control system.</p> <p>Planning-monitoring-controlling cycle, designing the monitoring system, monitoring methods, data collection.</p> <p>Quality standards, quality tools</p> <p>Project budgeting and control - Cost estimation, budgeting, Earn Value Analysis</p>	<p>Project closure</p> <p>Varieties of project termination, when to terminate project, the termination process, project final report.</p> <p>Understanding of cost elements</p> <p>Definition, types of cost, cost categories, production cost and product cost.</p> <p>Basic concepts for engineering economics</p> <p>Financial mathematics -time value of money, simple interest, compound interest, timeline, present value, future worth, interest rate, rate of return.</p> <p>Depreciation methods – straight line, declining balance, sum of the year digit (SYD), by unit of production</p> <p>Operating budgets</p> <p>Accounting and engineering economics – understanding of income statement, balance sheet, cash flow statement</p>
8	<p>References (include required and further readings, and should be the most current)</p>	<p>Main references supporting the course</p> <ol style="list-style-type: none"> 1.A Guide to the Project Management Body of Knowledge (PMBOK® Guide) — Sixth Edition, 2018, Project Management Institute. 2.Jack R. Meredith, Scott M. Shafer (2022), Project Management - A Managerial Approach, 11th Edition, Wiley. 3.Harold Kerzner, (2022), Project Management: A Systems Approach to Planning, Scheduling, and Controlling 13th Edition, Wiley 4. John A. White, Kellie S. Grasman, et al, (2020), Fundamentals of Engineering Economic Analysis, 2nd edition, Wiley <p>Additional references supporting the course</p> <ol style="list-style-type: none"> 1.A Guide to the Project Management Body of Knowledge (PMBOK® Guide) — Seventh Edition, 2021, Project Management Institute. 2.Erik W Larson. (2011), Project Management – the managerial process, 5th Edition, McGraw Hill. 3.Blank, L. T. & Tarquin, A. (2012), Engineering Economy, 7th Edition, McGraw Hill, New York, United States. 4.Don Newnan, Ted Eschenbach, et al, (2019), Engineering Economic Analysis, 14th Edition, Oxford University Press.

1.	Name of Course :	EMBEDDED SYSTEMS													
	Course Code :	AGEL2653													
2.	Synopsis :	The vast majority of computers in use today are embedded within physical systems to enable the automatically controlled products and devices that are used everywhere in modern society. Such computing systems are called embedded systems and generally in the form of microcontrollers. This course introduces microcontroller technology and the essential skills for developing microcontroller-based embedded systems.													
3	Credit Value :	3													
4	Prerequisite/co-requisite: (if any)	AGEL2623													
5	Course Learning Outcomes (CLO) :														
	CLO1	Apply suitable techniques for interfacing a microcontroller to peripheral devices in the development of well-defined electromechanical systems requiring automatic control and communication. (C3)													
	CLO2	Investigate to validate the relevant properties of well-defined peripheral devices by conducting suitable tests and measurements. (P3)													
	CLO3	Display proficiency in the prototyping of complete microcontroller-based embedded systems that are well-defined using modern integrated development tools. (P4)													
	CLO4	Function effectively in a technical team with members having unique areas of technical expertise and distinct management roles. (A2)													
	CLO5	Demonstrate self-directed learning of requisite know-how from datasheets/manuals to utilize unfamiliar embedded systems technology. (A2)													
6	Course Learning Outcomes (CLO)	Programme Learning Outcomes (PLO)													
		PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10	PLO11	PLO12		
	CLO 1			✓											
	CLO 2				✓										
	CLO 3					✓									
	CLO 4										✓				
	CLO 5											✓			
7	Course Content Outline														
	•Introducing embedded systems. •Microcontroller architecture and technology, programmer’s model, and modern devices. •Development processes, tools and resources. Getting started with a minimum system. •Digital input and output, voltages as logic values, interfacing to LEDs, switches, keypads, seven-segment displays, digital sensors, and power loads. •Measuring instruments, testing and troubleshooting.														
	•Polling and interrupt-driven inputs, counters, timers and time-triggered events, watchdog timer, and low-power mode.														
	•Data acquisition system, analog input and the ADC. Getting started with a minimum system. •Analog sensing, interfacing, and signal conditioning. •Data processing, manipulation and display. Interfacing to LCDs. •The scientific (experimental) method, test and measurement to validate relevant device properties. •Analog outputs, the DAC, PWM and applications.														

	<ul style="list-style-type: none"> •Structured program design, flow charts, pseudocode, functions, reuse, modular programs, and bespoke libraries. •Asynchronous serial data communication and the USART. •Introducing synchronous serial communication, the SPI, I2C, and intelligent instrumentation. •Network links, wireless links, and comparison of serial communication protocols.
8	<div> <div>References (include required and further readings, and should be the most current)</div> <div> <p>Main references supporting the course</p> <ol style="list-style-type: none"> 1.Tam Hanna, 2020. Microcontroller Basics with PIC, Elektor International Media BV. 2.Martin Bates, 2014. Interfacing PIC Microcontrollers: Embedded Design by Interactive Simulation, 2nd Edition, Elsevier/Newnes. <p>Additional references supporting the course</p> <ol style="list-style-type: none"> 3.Martin Bates, 2011. PIC Microcontrollers: An Introduction to Microelectronics, 3rd Edition, Elsevier/Newnes. 4.Tim Wilmshurst, 2010. Designing Embedded Systems with PIC Microcontrollers: Principles and Applications, 2nd Edition, Elsevier/Newnes. </div> </div>

1.	Name of Course :	ELECTRICAL TECHNOLOGY AND CIRCUITS													
	Course Code :	AGEL2663													
2.	Synopsis :	The course aims to provide students with the fundamental knowledge of electrical systems which forms the foundation for further studies in the field of electrical engineering.													
3	Credit Value :	3													
4	Prerequisite/co-requisite: (if any)	AGEL1523													
5	Course Learning Outcomes (CLO) :														
	CLO1	Examine the elementary operational performance of power transformers and three-phase systems. (C3, P3)													
	CLO2	Describe the operation of electrical machines. (C2)													
	CLO3	Use network components and parameters for network analysis. (C3)													
6	Course Learning Outcomes (CLO)	Programme Learning Outcomes (PLO)													
		PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10	PLO11	PLO12		
	CLO 1		✓												
	CLO 2	✓													
	CLO 3				✓										
7	Course Content Outline														
Introduction to Transformer															
•Principles of transformer operation.															
•EMF equation of a transformer.															
•Phasor diagram under no load and loaded conditions.															
Advance Transformer															
•Leakage flux.															
•Transformer ratings and efficiency															
•Impedance transformation															
•Open circuit, short circuit tests															
•Voltage regulation, power factor															
Power Distribution															
•Three-phase systems															
•Relationships between line and phase voltages in star and delta															
•Connected system with balanced load															
•Measurement of power and power factor															
Electric and Magnetic Field															
Deflection															
•Effects of electric and magnetic fields on charged particles, electron beam deflection															
Introduction to Electrical Machines															
•DC motors: characteristics of permanent magnet, series and shunt type															
•AC motors: characteristics of induction motors, motor selection, installation and maintenance															
•Contactors and motor starters:															
magnetic contactor, symbols, construction, ratings, applications, solid-state contactor															

	<p>Advance Electrical Machines</p> <ul style="list-style-type: none"> •Magnetic Motor starters: construction, control circuits and overload protection devices •Introduction to motor control: motor starting, motor stopping •Motor speed control: DC motor control, field control, and armature control •Principles and applications of stepping motor, servo motor and drive circuits 		
	<p>Network Theory</p> <ul style="list-style-type: none"> •Introduction to network theories •Iterative, image and characteristic impedance •Image transfer coefficient •Insertion loss •Attenuators •Equivalent (T) and equivalent pi (?) networks •Use of transmission parameters 		
	<p>Transmission Line Theory</p> <ul style="list-style-type: none"> •Lump and distributed circuits, propagation coefficient •Current and voltage relationships, reflection coefficient, voltage and current on a mismatched line, standing waves •Impedance matching using Smith Chart 		
8	<table border="1"> <tr> <td data-bbox="103 772 690 1419"> <p>References (include required and further readings, and should be the most current)</p> </td><td data-bbox="690 772 1513 1419"> <p>Main references supporting the course</p> <ol style="list-style-type: none"> 1.Boylestad RL 2016, Introductory Circuit Analysis, 13th Edn, Pearson, New Jersey. 2.Alexander CK & Sadiku MNO 2021, Fundamentals of Electric Circuits, 7th Edn, McGraw Hill, New York. <p>Additional references supporting the course</p> <ol style="list-style-type: none"> 1. Wildi, T 2006, Electrical Machines, drives and power System, 6th Edn, Pearson / Prentice Hall, New Jersey. 2. Chapman, SJ 2012, Electric machinery Fundamentals, 5th Edn, McGraw Hill, New York. 3. Mohamed E. El-Hawary 2002, Principles of electric machines with power electronic applications, IEEE, New Jersey. </td></tr> </table>	<p>References (include required and further readings, and should be the most current)</p>	<p>Main references supporting the course</p> <ol style="list-style-type: none"> 1.Boylestad RL 2016, Introductory Circuit Analysis, 13th Edn, Pearson, New Jersey. 2.Alexander CK & Sadiku MNO 2021, Fundamentals of Electric Circuits, 7th Edn, McGraw Hill, New York. <p>Additional references supporting the course</p> <ol style="list-style-type: none"> 1. Wildi, T 2006, Electrical Machines, drives and power System, 6th Edn, Pearson / Prentice Hall, New Jersey. 2. Chapman, SJ 2012, Electric machinery Fundamentals, 5th Edn, McGraw Hill, New York. 3. Mohamed E. El-Hawary 2002, Principles of electric machines with power electronic applications, IEEE, New Jersey.
<p>References (include required and further readings, and should be the most current)</p>	<p>Main references supporting the course</p> <ol style="list-style-type: none"> 1.Boylestad RL 2016, Introductory Circuit Analysis, 13th Edn, Pearson, New Jersey. 2.Alexander CK & Sadiku MNO 2021, Fundamentals of Electric Circuits, 7th Edn, McGraw Hill, New York. <p>Additional references supporting the course</p> <ol style="list-style-type: none"> 1. Wildi, T 2006, Electrical Machines, drives and power System, 6th Edn, Pearson / Prentice Hall, New Jersey. 2. Chapman, SJ 2012, Electric machinery Fundamentals, 5th Edn, McGraw Hill, New York. 3. Mohamed E. El-Hawary 2002, Principles of electric machines with power electronic applications, IEEE, New Jersey. 		

1.	Name of Course :	ELECTRONIC INSTRUMENTATION AND COMMUNICATIONS													
	Course Code :	AGEL2673													
2.	Synopsis :	Instrumentation is the branch of engineering that deals with measurement and control while telecommunication engineering is one of the specialised application areas of Electronic Engineering. As such, this course will equip students with the fundamentals of instrumentation and basic principles of communication engineering.													
3	Credit Value :	3													
4	Prerequisite/co-requisite: (if any)	Nil													
5	Course Learning Outcomes (CLO) :														
	CLO1	Apply the principles of modern electronic instruments. (C3)													
	CLO2	Apply the principles of analogue and digital communication theory. (C3)													
	CLO3	Assemble simple modulator/demodulator, ADC/DAC trainer kit and analyse the obtained result waveform using modern electronic instruments. (P3)													
6	Course Learning Outcomes (CLO)	Programme Learning Outcomes (PLO)													
		PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10	PLO11	PLO12		
	CLO 1		✓												
	CLO 2		✓												
	CLO 3					✓									
7	Course Content Outline														
Introduction •Model of a communication system in block diagram, examples of full duplex, half-duplex, and simplex communication systems.															
Nature of signal source •Introduce time and frequency domain representation of analogue and digital signals. •Concepts of signal bandwidth and bit rates.															
Modulation Principles •Introduction to modulation principles. •Modulation techniques using AM & FM. •Modulated signal characteristics, spectrum, bandwidth and power for both AM & FM. •Basic Modulation circuits for both circuits.															
Digital Communication Systems •Introduction to digital communication system. •Signal Digitization using PCM. •Binary modulation techniques using ASK, FSK and PSK. •Differentiate pulse modulation types •Working principle of pulse code modulation															
Noise Degradations in Signal Transmission •Effect of noise degradation on communication systems, sources of internal and external noise in receiving system, signal-to-noise ratio, qualitative comparison of noise performance of AM and FM receivers. •Bit error mechanism in digital communication system, bit-error rate															

	<p>Introduction to Instrumentation</p> <ul style="list-style-type: none"> • Precision of measurement, errors. • Basic measurement Instrument • Voltage, current, resistance measuring principles using PMMC instrument • Resistance, inductance, capacitance measurement using bridges
	<p>Electronic Instrumentation</p> <ul style="list-style-type: none"> • Oscilloscope operating procedures. • Introduction to various signals and generator circuits in signal generators • Data acquisition card. Analogue to Digital converter and Digital to Analogue converter (ADC and DAC) and virtual instrumentation.
8	<p>References (include required and further readings, and should be the most current)</p> <div> <p>Main references supporting the course</p> <ol style="list-style-type: none"> 1. Robert B. Northrop. , Introduction to instrumentation and measurements, 3rd edition, CRC Press, (2014) 2. Singh, R. P., Communication systems : analog and digital, 3rd Edition, McGraw-Hill (2015) <p>Additional references supporting the course</p> <ol style="list-style-type: none"> 1. Thomas L Floyd, 2011. Electronic Devices, 9th edn, Prentice Hall. 2. Robert L. Boylestad, Louis Nashelsky, (2008) Electronic Devices and Circuit Theory, 10th Edition, Prentice Hall. 3. Theodore F. Bogart, Jeffrey S. Beasley and Guillermo Rico, (2004) Electronic Devices and Circuits, 6th Edition, Prentice Hall. 4. Thomas L. Floyd, (2004) Electronics Fundamentals: Circuits, Devices, and Applications, 6th Edition, Prentice Hall. </div>

1.	Name of Course :	PROJECT II													
	Course Code :	AGEL3004_2													
2.	Synopsis :	In the increasing recognition of the importance of practical know-how in industry, engineering technology curriculum needs to be based on hands-on practical work. This course provides an opportunity for students to analyse and design using appropriate modern technology for systems with actual hardware implementation that involves consideration for public health and safety, cultural, societal, project management and environmental concerns. By incorporating practical design into the programme, the curriculum would enhance the skills of the students and equip them with practical knowledge to function with competencies and creativities in the engineering technology profession.													
3	Credit Value :	2													
4	Prerequisite/co-requisite: (if any)	Nil													
5	Course Learning Outcomes (CLO) :														
	CLO1	Conduct literature review required for the applied engineering problem. (A3)													
	CLO2	Analyze an applied engineering problem through appropriate codified methods. (C4)													
	CLO3	Design solutions for solving an applied engineering problem by incorporating considerations on public health and safety, society, environment and sustainability (C6)													
	CLO4	Evaluate health, safety, and legal issues on the project implementation. (C5)													
	CLO5	Evaluate the impact of engineering solutions in societal and environmental contexts and demonstrate knowledge of and need for sustainable development. (C5)													
	CLO6	Apply ethical principles and professional norms in solving an engineering problem. (A4)													
	CLO7	Apply logical troubleshooting procedures to solve problems. (P3)													
	CLO8	Use proper workshop tools, techniques and multimedia technologies for intended tasks. (P4)													
	CLO9	Practice proper project management skills with consideration on resource management. (C3)													
	CLO10	Present project deliverables effectively through oral and written modes. (A3)													
6	Course Learning Outcomes (CLO)	Programme Learning Outcomes (PLO)													
		PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10	PLO11	PLO12		
	CLO 1										✓				
	CLO 2		✓												
	CLO 3			✓											
	CLO 4					✓									
	CLO 5						✓								
	CLO 6							✓							
	CLO 7				✓										

7	CLO 8					✓								
	CLO 9											✓		
	CLO 10									✓				
	Course Content Outline													
8	Lectures on the following topics: - General briefing of project titles - Proposal and Report writing - Literature search													
	Project implementation													
	References (include required and further readings, and should be the most current)					<p>Main references supporting the course:</p> <ol style="list-style-type: none"> 1. Ranjit Kumar (2019), Research methodology : a step-by-step guide for beginners, 5th Edition, SAGE Publication. 2. Dipankar Deb, Rajeeb Dey, Valentina E. Balas (2019), Engineering Research Methodology: A Practical Insight for Researchers, Springer. <p>Additional references supporting the course</p> <p>Nil</p>								

1.	Name of Course :	COCURRICULAR ACTIVITIES												
	Course Code :	COCU												
2.	Synopsis :	<p>Tunku Abdul Rahman University College believes in providing a holistic education. The moral, social and physical aspects of a student's life are as important as the student's academic and intellectual development.</p> <p>The Co-curricular course is compulsory for all students pursuing TAR University College's Diploma and Bachelor Degree programmes. Students are required to complete and pass two credit hours before they can graduate at every level of their studies. Students taking the Co-curricular course will be graded. However, the grades will not contribute to the GPA and CGPA.</p>												
3	Credit Value :	2												
4	Prerequisite/co-requisite: (if any)	Nil												
5	Course Learning Outcomes (CLO) :													
6	Course Learning Outcomes (CLO)	Programme Learning Outcomes (PLO)												
		PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10	PLO11		
7	Course Content Outline													
8	References (include required and further readings, and should be the most current)													

1.	Name of Course :	INDUSTRIAL CONTROL AND AUTOMATION													
	Course Code :	AGEL2683													
2.	Synopsis :	The knowledge in Industrial Control and Automation is essential due to technological advancements in process monitoring, control and industrial automation over the past decades which have contributed greatly to improve the productivity of virtually all manufacturing industries throughout the world. As such, this course will equip students with the knowledge and skills to apply in industrial manufacturing and automation related work.													
3	Credit Value :	3													
4	Prerequisite/co-requisite: (if any)	Nil													
5	Course Learning Outcomes (CLO) :														
	CLO1	Describe the operation of instrumentation and sensors in industrial process control. (C2)													
	CLO2	Demonstrate an understanding of process control concept.(C2)													
	CLO3	Construct ladder diagrams of programmable logic controller (PLC) for common industrial application. (C4)													
	CLO4	Demonstrate skills in employing PLC for automation of industrial processes. (P4)													
	CLO5	Demonstrate ability to work effectively in a team in troubleshooting the ladder diagram. (A2)													
6	Course Learning Outcomes (CLO)	Programme Learning Outcomes (PLO)													
		PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10	PLO11	PLO12		
	CLO 1		✓												
	CLO 2	✓													
	CLO 3			✓											
	CLO 4					✓									
	CLO 5										✓				
7	Course Content Outline														

Industrial Control Devices

- Manually operated switches
- Mechanically operated switches

Transducers and sensors

- Proximity sensors, magnetic switches, ultrasonic sensors.

Mechanical sensors

- Displacement sensors:
- Motion Sensors
- Pressure Sensor
- Flow Sensors

Thermal Sensors

- Temperature sensors

Optical sensors

- Photo sensors,
- Application in bar-code system.

Final Control

- Actuators
- Solid-State Power Switch, symbols, construction, turn-on and turn-off characteristics, output voltage control.

Process Control Systems

- Introduction to process control principles, block diagrams, Control system evaluation and characteristics, stability and regulation, steady state and transient response
- Configuration of Control Systems: Open-loop control system, e.g. open-loop motor speed control, Closed-loop control system, e.g. closed-loop motor speed controller.

Types of Control

- Motion control: reciprocating motion machine process, programmable motion control systems.
- Time control: time delay relay, types of timers.
- Count control: application of counters in process control and monitoring systems.
- Pressure control: electrical control of a pneumatic-operated system, pressure transducer control of a motor.
- Temperature control: on/off control proportional control, PID control.
- Motor Speed Control: CD player spindle speed control.

Discrete State Process Control

- Definition, applications examples, Discrete State Variables, Process specifications, Process hardware, Event sequence description.
- Relay controllers and Ladder Diagrams.
- Programmable Logic Controllers (PLC) Overview
- Process control application: PLC ladder logic diagram.
- Basics of PLC programming:
- Timer and counter instructions:
- Data manipulation instructions
- Shift Register and Sequencer Instructions

Robotics and Automation

- History of automatic control, robot classifications and terminology,
- Robot power sources, robot controllers, robot sensory systems.

8	References (include required and further readings, and should be the most current)	<p>Main references supporting the course</p> <ol style="list-style-type: none"> 1. Franklyn W. Kirk, Instrumentation and Process Control, Amer Technical Pub, 7th Edition (2019) 2. Frank Petruzella, Programmable Logic Controllers, 6th Edition, McGraw-Hill (2022) <p>Additional references supporting the course</p> <ol style="list-style-type: none"> 1. Terry L. M. Bartelt, Industrial Automated Systems: Instrumentation and Motion Control, Cengage Learning (2010). 2. Terry Bartelt, Instrumentation and process control, Thomson/Delmar learning (2007). 3. Terry Bartelt, Industrial control electronics: devices, systems, and applications, 3rd Edition, Thomson/Delmar learning (2006). 4. James A. Rehg, Glenn J. Sartori, Industrial electronics, Prentice Hall (2006).
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1.	Name of Course :	ENGINEERING PERSPECTIVES AND SKILLS													
	Course Code :	AGEL2652													
2.	Synopsis :	In today's world, it is essential that students who pursue a course in engineering technology understand the perspectives of the engineering technician profession, use numerical analysis in technical problem solving and be equipped with the necessary project management and communication skills to effectively put engineering into practice.													
3	Credit Value :	2													
4	Prerequisite/co-requisite: (if any)	Nil													
5	Course Learning Outcomes (CLO) :														
	CLO1	Relate the roles and responsibilities of professional engineers in society. (C3)													
	CLO2	Use various tools and techniques in developing and implementing of an engineering technical project. (C3)													
	CLO3	Solve engineering problems using mathematical modelling with the aid of computer programming software. (C3)													
6	Course Learning Outcomes (CLO)	Programme Learning Outcomes (PLO)													
		PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10	PLO11	PLO12		
	CLO 1						✓								
	CLO 2			✓											
	CLO 3					✓									
	7	Course Content Outline													
The Engineering Profession <ul style="list-style-type: none">Professionalism and its characteristicsField of specialization in engineeringTypes and responsibility of engineer in societyRoles and functions of professional bodiesEngineering ethics with ethical case studies															
Realization of Engineering Projects and Systems <ul style="list-style-type: none">Concepts and roles of research, design and developmentDesign model and generic steps in design processDesign & development stages from concept generation, presentation to implementation and testingDesign and development techniques, computer design packages															
Mathematical Modeling and Simulation <ul style="list-style-type: none">Numerical methods which includes differentiation, integration, solving of equation and curve fittingUse of computer programming software (Matlab) as a tool to solve mathematical modeling in engineering problems															
Communication <ul style="list-style-type: none">Technical report writingTechnical communication and presentation skills															
Project Planning and Evaluation <ul style="list-style-type: none">Project managementProject planning techniques – PERT and CPM inclusive of time-cost analysis															

	Project Planning and Evaluation <ul style="list-style-type: none"> Decision making under condition of uncertainty and risk e,g, maximin, maximax, expected value, decision tree etc., risk analysis and risk management 	
8	References (include required and further readings, and should be the most current)	<p>Main references supporting the course</p> <ol style="list-style-type: none"> 1. Stephen J. Chapman, (2018). Essentials of MATLAB programming, Cengage Learning. 2. Jack Gido, Jim Clements, Rose Baker, (2018). Successful Project Management, 7th edition. Cengage Learning. <p>Additional references supporting the course</p> <ol style="list-style-type: none"> 3. B. C. Punmia, K. K. Khandelwal, (2002). Project Planning and Control with PERT & CPM, 4th Edition, Laxmi Publications (P) LTD. 4. O. Beucher, M. Weeks, (2006), Introduction to MATLAB and SIMULINK: a project approach, 3rd edition, Infinity Science Press.

1.	Name of Course :	CIVIC CONSCIOUSNESS AND VOLUNTEERISM													
	Course Code :	MPU-2282													
2.	Synopsis :	This course discusses on how a person can discover his own potential as a member of the society in which he/she lives so that he/she can contribute positively towards its development. During the study, students have to carry out varieties of projects in order to create awareness among the society. Among the projects are, fund raising activities, educational visit to orphanage, old folk homes and refugee centres and collaborating with various local NGO's on certain issues.													
3	Credit Value :	2													
4	Prerequisite/co-requisite: (if any)	Nil													
5	Course Learning Outcomes (CLO) :														
	CLO1	Organise a volunteer or charity activity for the benefit of the society. (P4)													
	CLO2	Carry out a reflective dialogue on issues that are in need of civic awareness and responsibilities. (A4)													
	CLO3	Write a reflective report concerning a volunteer or charity activity. (A4)													
6	Course Learning Outcomes (CLO)	Programme Learning Outcomes (PLO)													
		PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10	PLO11	PLO12		
	CLO 1											✓			
	CLO 2								✓						
	CLO 3								✓						
7	Course Content Outline														
An Overview and Civic Conception - <ul style="list-style-type: none">• Definition of Civic and Civic Awareness• Malaysian Civic Awareness• Self-Building – Mind, Body and Soul• The National Identity• The Government															
Developing Consciousness toward My Own Potential - <ul style="list-style-type: none">• Beginning from the man in the mirror: Evaluating own strengths and weaknesses• The importance of developing own potential• Values for the development of own potential• Nature vs Nurtured• Malaysia’s Education															
Building and expanding My Potential - Civic Consciousness - <ul style="list-style-type: none">• Family• Friends• Community• Nation• World															

	<p>Civic Consciousness in the Malaysian Context – Socio-cultural Awareness and Awareness of the Legal System -</p> <ul style="list-style-type: none"> • Issues of Race, Class and Gender • The Uniqueness of Malaysian Culture and Traditions • Citizen: Responsibility and Tolerance • Conditional Freedom of Rights Speech Religion Assembly
	<p>Civic Consciousness in the Malaysian Context - Civic Awareness and the Economy -</p> <ul style="list-style-type: none"> • The Use of Public Amenities • Road Usage • Wastage
	<p>Civic consciousness in the Malaysia and Global Context -</p> <ul style="list-style-type: none"> • Environment • The Cyber World
	<p>Translating Civic Consciousness into Civic Responsibility -</p> <ul style="list-style-type: none"> • The Need of Concrete and Pragmatic Actions • Volunteerism • Fundraising
	<p>Reflection on Civic Consciousness -</p> <ul style="list-style-type: none"> • Extraordinary Deeds by Ordinary Malaysians • Philanthropists of Malaysia • Charities and Non-Governmental Organisations
8	<p>References (include required and further readings, and should be the most current)</p> <div> <p>1.Chew Wei Wei et.al 2019, Civic Consciousness and Volunteerism, Cengage Asia Ltd. Ptd.</p> <p>2. Richard M 2016, Altruism: the power of compassion to change yourself and the world, Little, Brown and Co., New York.</p> </div>

1.	Name of Course :	INDUSTRIAL TRAINING													
	Course Code :	AGEL3908													
2.	Synopsis :	There is no real substitution for first-hand experience in an engineering practice, it is of vital importance for engineering students to familiar and expose themselves at a practical level of engineering practices. Objectives: This course provides students to the real working environment, gain hands-on experience related to their programme discipline, prepare and enhance students’ ability to face the challenges posed by the industry.													
3	Credit Value :	8													
4	Prerequisite/co-requisite: (if any)	Nil													
5	Course Learning Outcomes (CLO) :														
	CLO1	Apply relevant engineering knowledge in accordance to industry practice. (C4)													
	CLO2	Participate in industrial activities within resources given. (A3)													
	CLO3	Demonstrate good attitude and ethics in accordance with professional engineering practice. (A3)													
	CLO4	Demonstrate competency in communication skills at workplace. (A3)													
	CLO5	Demonstrate the ability to work effectively in a workgroup. (A3)													
	CLO6	Practise project management skills with consideration on resource management. (C3)													
6	Course Learning Outcomes (CLO)	Programme Learning Outcomes (PLO)													
		PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10	PLO11	PLO12		
	CLO 1	✓													
	CLO 2						✓								
	CLO 3								✓						
	CLO 4									✓					
	CLO 5										✓				
	CLO 6												✓		
7	Course Content Outline														
	Pre-commencement briefings to students.														
	Internship														
	Students will participate in daily engineering activities and processes of the organisation such as production, design, maintenance, service, installation, collecting and analysis of data, coordinating group activities, attending meetings and discussions, etc.														

8	References (include required and further readings, and should be the most current)	<p>Main references supporting the course:</p> <ol style="list-style-type: none"> 1. Kevin Kelloway, Lori Francis, Bernadette Gatien (2020), Management of Occupational Health and Safety, 8th edition, Nelson Education Limited. 2. Charles E Harris, Jr., (2019) Engineering Ethics: Concepts and cases, 6th Edition, Boston, Cengage Learning <p>Additional references supporting the course:</p> <ol style="list-style-type: none"> 1. Charles B. Fleddermann, (2012) Engineering Ethics, 4th Edition, Pearson/Prentice Hall
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1.	Name of Course :	INTEGRITY AND ANTI-CORRUPTION													
	Course Code :	MPU-2342													
2.	Synopsis :	This course covers the basic concept of corruption, including the value of integrity, anti-corruption, forms of corruption, abuse of power in daily activities and organisations, as well as ways to prevent corruption. Cases related to corruption are discussed. Teaching and learning methods are implemented in the form of ‘experiential learning’ through individual and group activities. At the end of this course, students will be able to understand the practise of integrity, the concept of corruption, anti-corruption, abuse of power, and the prevention of corruption in society and organizations.													
3	Credit Value :	2													
4	Prerequisite/co-requisite: (if any)	Nil													
5	Course Learning Outcomes (CLO) :														
	CLO1	Assume responsibility in upholding integrity and anti-corruption by producing a public service video. (A3, PLO8)													
	CLO2	Present the types of corruption and abuse of power in different settings. (A2, PLO10)													
	CLO3	Express the importance of integrity and anti-corruption in life. (A3, PLO8)													
6	Course Learning Outcomes (CLO)	Programme Learning Outcomes (PLO)													
		PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10	PLO11	PLO12		
	CLO 1								✓						
	CLO 2										✓				
	CLO 3								✓						
	7	Course Content Outline													
Chapter 1: Overview of the Integrity and Anti-Corruption Course - Introduction to Integrity and Anti-Corruption Course - The Importance of Integrity and Anti-Corruption Course - Background and overall picture of the Integrity and Anti-Corruption Course															
Chapter 2: Integrity is the Core of Nation's Well-being - Corporate Governance - Human Governance - Ethics in Life - Definitions of integrity - Factors that compromise integrity - The fields of work which involve high integrity issues - Cultivating Integrity among students - Government initiative to enhance public service integrity															
Chapter 3: Avoid Corruption, Pursue Dignity - Definition of corruption and anti-corruption - Why is corruption a serious crime? - Which group of people have high potential to be involved in corruption - Mindset of corrupted people - The fields of work with high risk of corruption - Malaysia’s ranking in Corruption Perception Index (CPI)															

	<p>Chapter 4: Agencies Related to the Prevention of Corruption and Cultivating Integrity</p> <ul style="list-style-type: none"> - Malaysian Anti-Corruption Commission (MACC) as the Leading Anti-corruption Agency - Other agencies which serve to enhance integrity and governance 		
	<p>Chapter 5: Corruption According to the MACC Act 2009</p> <ul style="list-style-type: none"> - Various forms of corruption and bribery - Corruption offences under MACC Act 2009 - How do gifts become bribes according to Malaysia's law - Acts of Corruption and legal implication 		
	<p>Chapter 6: Corporate Liability Offence</p> <ul style="list-style-type: none"> - Corruption offence by commercial organisation in Section 17A MACC Act 2009 - Definition of commercial organisation and parties involved - Punishment for corporate liability offence - Guideline to avoid corporate liability - TRUST principles under Section 17A MACC Act 2009 		
	<p>Chapter 7: White-collar Crimes</p> <ul style="list-style-type: none"> - Definition of white-collar crime - White-collar crime vs blue-collar crime - Effects of white-collar crimes - Examples of white-collar crimes - local and international - Recent white-collar crimes - Identifying a fraudster's profile 		
	<p>Chapter 8: Causes, Symptoms and Effects of Corruptions</p> <ul style="list-style-type: none"> - Causes of corruption based on several theories - Symptoms of corruption - Effects of corruption on individual, society and country 		
	<p>Chapter 9: Fight Against Corruption; Reporting corruption, preventive measures and government initiatives</p> <ul style="list-style-type: none"> - Procedure to report corruption - Whistle-blower and witness protection - Corruption prevention measures and tips to avoid corruption - Government initiatives on corruption prevention 		
	<p>Chapter 10: Roles played by Social Institutions in Cultivating Integrity and Anti-Corruption</p> <ul style="list-style-type: none"> - Cultivating Integrity and Anti-Corruption - Roles of family institution - Roles of religious institution - Roles of educational institution 		
8	<table border="1"> <tr> <td data-bbox="105 1381 690 1728">References (include required and further readings, and should be the most current)</td> <td data-bbox="690 1381 1515 1728"> <ol style="list-style-type: none"> 1. Mohamad Tarmize Abdul Manaf (2021), Handbook on anti-corruption, Putrajaya. 2. Zukanain Abdul Rahman (2020), MACC The history : the battle for corruption-free malaysia, Univeristi Malaya Press. 3. The Center to Combat Corruption and Cronyism (2020), State of corruption power, politics and policies in Malaysia, Gerak Budaya Enterprise. </td> </tr> </table>	References (include required and further readings, and should be the most current)	<ol style="list-style-type: none"> 1. Mohamad Tarmize Abdul Manaf (2021), Handbook on anti-corruption, Putrajaya. 2. Zukanain Abdul Rahman (2020), MACC The history : the battle for corruption-free malaysia, Univeristi Malaya Press. 3. The Center to Combat Corruption and Cronyism (2020), State of corruption power, politics and policies in Malaysia, Gerak Budaya Enterprise.
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1.	Name of Course :	PENGHAYATAN ETIKA DAN PERADABAN													
	Course Code :	MPU-2173													
2.	Synopsis :	Kursus ini menjelaskan tentang konsep etika daripada perspektif peradaban yang berbeza bagi mengenal pasti sistem, tahap perkembangan, kemajuan dan kebudayaan merentas bangsa dalam mengukuhkan kesepaduan sosial menurut acuan Malaysia. Selain itu, perbincangan juga berkaitan isu-isu kontemporari dalam aspek ekonomi, politik, sosial, budaya dan alam sekitar daripada perspektif etika dan peradaban yang dapat melahirkan pelajar yang bermoral dan profesional.													
3	Credit Value :	3													
4	Prerequisite/co-requisite: (if any)	Nil													
5	Course Learning Outcomes (CLO) :														
	CLO1	Membentangkan Konsep Etika dan Peradaban dalam Kehidupan Seharian. (A2)													
	CLO2	Menjustifikasikan Isu Etika Dan Peradaban Dalam Acuan Malaysia Berdasarkan Senario Semasa. (A3)													
	CLO3	Menjelaskan Peranan Etika dan Peradaban dalam Kajian Kes Tempatan dan Antarabangsa. (A3)													
6	Course Learning Outcomes (CLO)	Programme Learning Outcomes (PLO)													
		PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10	PLO11	PLO12		
	CLO 1									✓					
	CLO 2									✓					
	CLO 3											✓			
7	Course Content Outline														
Bab 1 Pengenalan Penghayatan Etika dan Peradaban dalam Acuan Malaysia															
• Definisi Etika & Adab															
• Susur masa Etika & Peradaban															
• Zaman PascaKolonial & Era Moden															
• Percampuran Versi Etika Melalui Teknologi															
• Etika dalam Persekitaran Formal & Tidak Formal															
• Etika & Peradaban – Acuan Sosiologi, Sejarah, Struktur Sosial & Biografi															
• Penghayatan Etika dan Peradaban – Masyarakat, Negara & Pasaran															
Bab 2 Konsep Etika & Peradaban															
• Konsep Etika															
• Perspektif Agama & Kepercayaan – Hindu, Buddha, Islam, Kolonial & PascaKolonial															
• Konsep Peradaban – Kolonial & PascaKolonial, Timur Barat, Perspektif Agama & Kepercayaan															
Bab 3 Etika & Peradaban dalam Masyarakat Kepelbagaian															
• Petempatan Masyarakat															
• Garis Masa Pembentukan Masyarakat Malaysia															
• Proses Pembentukan Kelompok Mayarakat															
• Pembinaan Negara Bangsa – Integrasi															
• Sasaran & Objektif DEB															
Bab 4 Pemantapan Kesepaduan Nasional Malaysia															
• Perpaduan: Matlamat Diidamkan															
• Kesepaduan: Tahap Dicapai															

	<p>Bab 5 Pembinaan Peradaban Majmuk Di Malaysia</p> <ul style="list-style-type: none"> • Perkembangan Sejarah Peradaban Di Alam Melayu • Sejarah Sosial di Malaysia • Konsep Negara & Bangsa • Idea Bangsa Malaysia 		
	<p>Bab 6 Perlembagaan Persekutuan – Tapak Integrasi, Wahana Etika & Peradaban</p> <ul style="list-style-type: none"> • Definisi & Konsep Tapak Integrasi • Definisi & Konsep Perlembagaan • Sejarah & Latar Belakang Perlembagaan • Tiang Seri Perlembagaan 		
	<p>Bab 7 Teknologi Maklumat & Komunikasi Penggerak Kesepaduan Nasional Di Malaysia</p> <ul style="list-style-type: none"> • Evolusi & Pengglobalan Teknologi • Evolusi Teknologi & ICT Di Malaysia • Konsep Hubungan Manusia & Teknologi • Etika & Peradaban Dalam Penggunaan ICT • ICT Tapak Pengukuhan Kesepaduan Nasional • Isu Semasa ICT 		
	<p>Bab 8 Peranan Etika & Peradaban Mendokong Tanggungjawab Sosial Di Malaysia</p> <ul style="list-style-type: none"> • Konsep Takrifan Harian & Autoriti • Fungsi Etika & Peradaban Dalam Membentuk Tanggungjawab Sosial • Kesedaran Nasional Dalam Tanggungjawab Sosial • Tanggungjawab Sosial Dalam & Luar Negara 		
	<p>Bab 9 Cabaran Kelestarian Etika & Peradaban Di Malaysia</p> <ul style="list-style-type: none"> • Kelestarian Etika & Peradaban Malaysia • Kedinamikan Etika & Peradaban Malaysia • Hakisan Sosial Ke Atas Kelestarian Etika & Peradaban • Kelansungan Kelestarian Etika & Peradaban – Pembangunan Negara Bangsa & Ketamadunan Malaysia 		
8	<table border="1"> <tr> <td data-bbox="105 1058 690 1272"> <p>References (include required and further readings, and should be the most current)</p> </td><td data-bbox="690 1058 1520 1272"> <p>1. Ateerah Abdul Razak, Nur Azuki Yusuff, Zaleha Embong, 2021, Penghayatan Etika dan Peradaban, UMK, Bachok, Kelantan.</p> <p>2. Ahmad Zamil Abdul Khalid (et al), 2021, Penghayatan Etika dan Peradaban, UUM Press, Sintok, Kedah.</p> </td></tr> </table>	<p>References (include required and further readings, and should be the most current)</p>	<p>1. Ateerah Abdul Razak, Nur Azuki Yusuff, Zaleha Embong, 2021, Penghayatan Etika dan Peradaban, UMK, Bachok, Kelantan.</p> <p>2. Ahmad Zamil Abdul Khalid (et al), 2021, Penghayatan Etika dan Peradaban, UUM Press, Sintok, Kedah.</p>
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