Details of Course units offered in the Degree Programme

The course units offered by the degree program are given in Tables below. The four auxiliary course units given in the Table 01 are offered in the pre-semester of the first year first semester to prepare the students to follow the technical subjects.

Table 01: Pre-Semester Course units

No.	Code	Title	Credits
1	AC 11012	Computer Literacy and Basic Application	2:15/30/55
2	AC 11022 (AE / EC)	Basic Mathematics	2:30/00/70
3	AC 11032	English I	2:30/00/70
4	AC 11041 (FS / AB)	Laboratory Techniques	1:00/30/20

Table 02: First Year First Semester Course units

No.	Code	Title	Credits
1.	AG 11013	Principles of Crop Production	3:30/30/90
2.	AS 11012	Principles of Animal Production	2:23/15/62
3.	AB 11012	Cell Biology and Crop Botany	2:15/30/55
4.	SS 11012	Nature of Soils	2:15/30/55
5.	AE 11012	Applied Hydrology and Engineering Drawing	2:15/30/55
6.	EC 11013	Principles of Micro and Macroeconomics	3:45/00/105
	Total		**14**

Table 03: First Year Second Semester Courses

No.	Code	Title	Credits
1.	AG 12012	Cereal Crops Production	2:20/20/60
2.	AS 12012	Anatomy and Physiology of Farm Animals	2:23/15/62
3.	AB 12012	Plant Physiology and Environmental Biology	2:23/15/62
4.	SS 12013	Soil Properties and Processes	3:30/30/90
5.	AE 12013	Principles of Farm Machinery	3:30/30/90
6.	EX 12012	Agricultural Extension and Communication	2:15/30/55
7.	AC 12012	English II	2:30/00/70
	Total		**14**

Pre-Semester Courses in the First Year

<table>
<tr><td>Course Title</td><td colspan="3">Computer Literacy and Basic Applications</td></tr>
<tr><td>Course Code</td><td colspan="3">AC11012</td></tr>
<tr><td>Credit Value</td><td colspan="3">02</td></tr>
<tr><td>Core/Elective</td><td colspan="3">Core</td></tr>
<tr><td>Prerequisite</td><td colspan="3">None</td></tr>
<tr><td rowspan="2">Notional hours</td><td>Theory</td><td>Practical</td><td>Independent learning</td></tr>
<tr><td>15</td><td>30</td><td>65</td></tr>
<tr><td>Objective/s</td><td colspan="3">Furnish the student with knowledge on the concepts of Computer Literacy, computer system and its function, computer network system, Internet basics and its concepts, windows environment and impart computer practical skills in handling word processing software, Internet and working with online collaboration application.</td></tr>
<tr><td>Intended Learning Outcomes</td><td colspan="3">• Apply computer technology as a tool for communication and collaboration
• Prepare materials related to learning, assignments, reports.
• Make use of computer technology for personal and professional growth
• Execute computer technology for research and generating new knowledge
• Explore new technologies/knowledge for career growth as lifelong learners</td></tr>
<tr><td>Detailed syllabus</td><td colspan="3">Theory
Computer Hardware and Software
History and classification of computers, Introduction to computer, computer hardware and different hardware peripherals devices and examples, Central processing unit, internal memory, Secondary storage medias and discussing different types and usage of input and output devices and their advantages and disadvantages. Introduction to software, types of software, introduction to open source software.

Computer Networking and Internet
Introduction to computer networking, network cabling, types of network, wireless network and network-related security issues, network topologies, basic networking devices, structure and functioning of the internet, internet of things.

Security and Computer ethics
Computer virus and different types, Protection against virus and spam emails, common attributes of the viruses, precautions from virus attack. Uses of the computer in different field, Computer ethics (Code of ethics, Computer crime, Copyright laws, fair-use guidelines, and plagiarism), usage of Learning Management System (LMS)

Practical</td></tr>
</table>

<table>
<tr><td></td><td colspan="4">Word processing application
introduction to Office applications and Word processing software, Creating, saving, and opening documents, Formatting and editing text, paragraphs, columns, adding pictures to pages, working with tables, charts, diagrams, referencing of captions, footnotes and endnotes, reference tables and indexes, bookmarks, security, working with Sections, Section breaks, change page setup, headers and footers, watermark, printer properties, and printing a document.

Presentation application
General introduction to multimedia application, Creating, saving, and opening presentations, working with slides, building presentations, adding pictures, artistic, adding sounds, movies, and links, Adding animations and special effects, Setting up and playing presentations.

Internet basics
Introduction to the Internet and the World Wide Web (www), Internet-browsing applications, Web addresses and links, Search engines and searching techniques, Uploading and downloading documents and other files, Saving information from web pages, Creating and using email to communicate and collaborate, Email management, Attaching documents, Introduction and working with online collaboration application, Sharing and accessing online files, personal organization using e-mail, calendar, tasks and cloud storage, e-learning and open educational resources using internet.</td></tr>
<tr><td>Teaching and Learning Methods / Activities</td><td colspan="4">Theory Lectures
Computer Laboratory Practical
Individual Assignments</td></tr>
<tr><td rowspan="2">Evaluation</td><td colspan="2">Theory (50%)</td><td colspan="2">Practical (50%)</td></tr>
<tr><td>Formative Assessment (30%)</td><td>Summative Assessment (70%)</td><td>Formative Assessment (30%)</td><td>Summative Assessment (70%)</td></tr>
<tr><td></td><td>Quiz- 10%
In Class Test – 15%
Assignment -5%</td><td>Two hours
Four out of five questions</td><td>Assignment1- 10%
Assignment2- 10%
Assignment3- 10%</td><td>Practical exam</td></tr>
<tr><td>Recommended Readings</td><td colspan="4">1. Emergent Learning. (2016). Introduction to Computers and Information Technology, 2nd Edition, Pearson.
2. Faithe Wempen. (2015). Computing Fundamentals: Introduction to Computers, Sybex publishers
3. Andrew S. Tanenbaum. (2003). Asia, Computer Networks (4th edition), Pearson Education
4. Alastair De Watteville, Lester Gilbert. (2000). Advanced information and communication technology, Edexcel Foundation</td></tr>
</table>

<table>
<tr><td>Course Title</td><td colspan="3">Basic Mathematics</td></tr>
<tr><td>Course Code</td><td colspan="3">AC 11022</td></tr>
<tr><td>Credit Value</td><td colspan="3">02</td></tr>
<tr><td>Core/Elective</td><td colspan="3">Core</td></tr>
<tr><td>Prerequisite</td><td colspan="3">None</td></tr>
<tr><td rowspan="2">Notional hours</td><td>Theory</td><td>Practical</td><td>Independent learning</td></tr>
<tr><td>30</td><td></td><td>70</td></tr>
<tr><td>Objective/s</td><td colspan="3">Provide students the mathematical concepts and their applications to analyze and interpret information in applied agricultural engineering and other related disciplines.</td></tr>
<tr><td>Intended Learning Outcomes</td><td colspan="3">• Describe basic concepts of graphs.
• Investigate the properties of polynomial, rational, exponential, and logarithmic functions.
• Demonstrate basic mathematical operations using calculus and matrices.
• Apply matrix methods to solve systems of linear equations.
• Evaluate outcomes of functions with constraints.
• Explain linear programming problems.
• Discuss descriptive properties of datasets and probabilities.</td></tr>
<tr><td>Detailed syllabus</td><td colspan="3">Theory
Functions and Graphs, Limits and Rate of change, Differentiation Techniques, Derivatives of differential function, Product and Quotient Rule of a Function, The Chain Rule and its Continuity of a Function, Derivative of Exponent and Logarithmic Function, Derivative and its Applications, Higher Order Derivatives & Curve Sketching, Maximization and Minimization Problems, Partial Derivatives and Relative Extremes, Implicit Differentiation and Rate of Changes, Integration Techniques, Definite Integral, Advanced Integration Techniques, Integration and its Applications, Area and Definite Integral, Area of the Two Curves, The Volume and Average Value.</td></tr>
<tr><td>Teaching and Learning Methods / Activities</td><td colspan="3">Lectures, Interactive Tutorial Classes and LMS.</td></tr>
<tr><td rowspan="3">Evaluation</td><td colspan="2">Theory</td></tr>
<tr><td>Formative assessment
(30%)</td><td>Summative Assessment
(70%)</td></tr>
<tr><td>Quiz - 10%
In Class Test - 15%
Assignment -5%</td><td>Three hours
Five out of six questions</td></tr>
<tr><td>Recommended Readings</td><td colspan="3">1. H. K. Dass. (2014). Advanced Engineering mathematics. Revised Edition, S Chand & Co Ltd
2. Larson and Edwards. (2003). Calculus: An applied approach. 6th edition, Houghton Mifflin Company
3. Stroud, K.A. (2003). Advanced Engineering Mathematics. 4th edition. Palgrave Macmillan
4. David, V. W. (2000). Advance calculus. Second edition. Harvord University</td></tr>
</table>

	5. Martin, M. L. (1999). Differential Geometry; Theory and Problems. University of Bridge port.

Course Title	English I		
Course Code	AC 11032		
Credit Value	02		
Core/Elective	Core		
Prerequisite	None		
Notional hours	Theory	Practical	Independent learning
	In-class sessions(compulsory) and Tutorials – 30 hours		(Study in the Library: 30 hours, Learning in Groups: 20 hours, Independent Learning: 20 hours)
Objective/s	Facilitate learners' to achieve higher level of proficiency, so that they will gain the ability to function effectively in communicative contexts: cope with and engage in day-to-day basic interpersonal communicative events fairly successfully; comprehend short academic texts; listen to lectures/read material comprehend messages therein and take down notes effectively in the relevant context; produce written and spoken discourses relevant to the field of study with substantial grammatical and pragmatic competence; respond to fairly complex spoken discourses.		
Intended Learning Outcomes	• Comprehend simple authentic/authoritative materials of different genres • Identify key and supporting (explicitly and implicitly) given ideas of written academic texts/short audio (lecture)/audio visual text • Construct simple, compound and complex sentences using appropriate tenses, voice and grammatical elements • Respond to multiple contexts of written and spoken discourses • Produce multiple contexts of written and spoken discourses • Describe people, places, tools, objects, processes, graphs, and tables • Apply cohesive devices appropriately in spoken and written communication • Write five-paragraph academic essays with cohesion and coherence • Apply grammatical rules and mechanics of writing • Synthesize information elicited from different resources • Paraphrase/Summarize simple academic texts • Use in-text citations to authenticate the arguments • Create a references list		

Detailed syllabus	**Listening:** Short extracts and longer texts (lectures, dialogues, announcements, talks, news online documentaries, YouTube lecture clips/discussions, etc.); to identify key ideas; supporting details; elicit explicitly and implicitly given messages; understand internal cohesion; following instruction and act upon (e.g. processes of conducting experiments; making a worm farm, vegetable bed, compost; production process etc.) (TOFEL writing question type 2 type of integrative tasks and Dictoglos tasks are recommended) **Speaking:** Simple day-to-day situations both inside and society at large focusing on making simple commands, asking for and giving directions, introducing self and others, describing events and processes; defining terms/phenomena; explaining the functions of objects; asking for things, permission, making inquiries using yes/no questions and wh-questions, and responding; asking questions and giving answers in the class, language for peer collaboration and maintaining teacher/peer rapport; making telephone calls; making short speeches; expressing and responding to opinions/personal feelings and attitudes; involving in conversations on particular topics and contexts; Preparing and giving PowerPoint Presentations (The contents given for speaking should focus the relevancy to their field of study). **Reading:** Short and simple authentic reading texts relevant to the course of study, letters, emails, reports, memos, advertisements, charts, web pages, magazines, research articles, reports, book index, content pages, dictionary extracts, OER materials, authoritative online resources, etc. with increasing complexity; different Note-taking methods; Cloze-passages; academic texts from the field (to unpack different kinds of paragraphs/essay structures: e.g. topic and thesis statement, supporting ideas, cohesive devices such as transitional words, conjunctions, articles, etc.; Understanding instructional words in testing tools such as examinations/CAs/FEs (Guided reading and Close-reading activities as instructional strategies, Collaborative Strategic Reading approaches are recommended). **Writing:** write short texts describing people, places, objects, instructions, processes, events, graphs, tables using appropriate and fairly correct language. Mind and Concept maps to plan essays. Paragraphs, short essays, email (netiquettes) , note writing, small ads, writing agenda for meetings and functions, leaflets, etc. gap filling exercise with blanks, sentences-completion, sentence-reordering, filling various forms, writing instructions. Different paragraphs: descriptive, discursive, expository, etc. Five paragraph academic essays: unpacking to understand cohesion, coherence, structure, organization, topic sentence, thesis statement, reporting words, hedging language. Constructing different types of academic paragraphs and essays. Essay marking criteria, Editing manual. [Use both process writing and product writing as instructional approaches recommended]. **Grammar & Vocabulary:** Sentences, small texts & exercises focussed on tense, voice, prepositions, articles, etc. Sentences, small texts and

<table>
<tr><td></td><td colspan="4">exercises on different types of sentences: simple, compound and complex sentences (noun/adjectival/adverbial clauses), if conditionals, (Teachers can use 3 dimensional Grammar Pie that elaborate structure, use and functions of grammar points such as voice, tense, etc. as an instructional approach is recommended). OER material and interactive activities freely available on the web can also be utilized.

Vocabulary - Sentences and simple texts that include words, terminology, register of a relevant field and practice exercises. Should improve not only passive but active vocabulary.</td></tr>
<tr><td>Teaching and Learning Methods / Activities</td><td colspan="4">CLT based illustrated lectures, presentations with interaction/feedback, interactive speaking activities, peer activities for writing, Content Language Integrated Learning (CLIL), Task Based Language Teaching (TBLT)</td></tr>
<tr><td rowspan="6">Evaluation</td><td rowspan="5">In course Assessment</td><td>Note taking from a text
(20 Marks)</td><td>7.5%</td><td rowspan="5">30%</td></tr>
<tr><td>Writing instructional manuals/posters/flyers/paragraphs on agricultural processes
(20 Marks)</td><td>7.5%</td></tr>
<tr><td>Listening - Note taking from a</td><td rowspan="3">7.5%</td></tr>
<tr><td></td></tr>
<tr><td>lecture/instructions
(20 Marks)</td></tr>
<tr><td>In Class Test
(20 Marks)</td><td>7.5%</td><td>30%</td></tr>
<tr><td colspan="4">End Semester Examination:
The question paper for the End Semester examination contains 2 parts. The duration of the written paper is 2 hours and the students are expected to answer all the questions,
Part I: Reading- choosing sub titles for paragraphs, true or false, matching words with similar meanings, skimming and scanning questions, transfer of information, etc. 20 Marks
Grammar & Vocabulary – tenses, voice, prepositions, word order, use of noun clauses, adjectives/adjectival clauses and adverbs/adverbial clauses, etc. 15 Marks
Writing – describing people, places objects, profile writing, note writing, , emails, , short essays & letters, small ads, agenda for meetings, leaflets etc. – 25 Marks
Part I - 60 Marks
Part II – 40 Marks
Speaking: Presentation/Viva Voce – 15 Marks
Listening: 10 Marks
Writing portfolio (15 Marks)</td><td>70%</td></tr>
</table>

	Total marks: 100 Marks. **(100 marks will be converted to 70 Marks)**	
Recommended Readings	1. Adrian, D. and Christopher, J. (2004). *Listening 1 and 2*. Ninth Imprint. Cambridge: Cambridge University Press. 2. Frangoise, G. (2012).*Developing Reading Skills: A Practical Guide to Reading Comprehension Exercises*. United Kingdom: Cambridge University Press. 3. Joanne, C. and Stephen, S. (2003). *Speaking 1 and 2 (Eleventh Imprint)*. Cambridge: Cambridge University Press. 4. John, S. (2013). *The Oxford Guide to Effective Writing and Speaking.* 3rd Edition. Oxford: Oxford University Press. 5. Raymond, M. (2012). *English Grammar in Use Book with Answer: A Self-Study Reference and Practice Book for Intermediate Learners of English*. Cambridge: Cambridge University Press. 6. Richard, H. (2011). *Headway Academic Skills: 3: Listening, Speaking, and Study Skills Student's Book.* Oxford: Oxford University Press. 7. Sarah, P. and Lesley, C, (2013). *Headway Academic Skills: 3: Reading, Writing, and Study Skills Student's Book.* Oxford: Oxford University Press. 8. Thomson, V. and Martinet,J. (2009). *A Practical Enlish Grammar*. ELBS. 9. Tricia, H. (2005). *Writing*. Oxford: Oxford University Press.	

Course Title	**Laboratory Techniques**		
Course Code	**AC 11041 (FS/AB)**		
Credit Value	**1**		
Core/Elective	Auxiliary Core Course		
Prerequisite	None		
Notional hours	Theory	Practical	Independent learning
	0	30	70
Objective/s	• Train students on basic laboratory skills such as health and safety in the laboratory, use of laboratory apparatus, fundamental laboratory techniques and preparing laboratory reports		
Intended Learning Outcomes	• Explain the uses of different laboratory apparatus and instruments • Choose appropriate health and safety measures in the laboratory • Demonstrate a range of fundamental laboratory skills • Infer the results of experiments		

<table>
<tr><td></td><td>• Interpret the observations of experiments</td></tr>
<tr><td>Detailed syllabus</td><td>General instructions, laboratory work safety, study of laboratory apparatus (apparatus for weighing, volumetric measurements, heating, stirring and filtration and analytical instruments), preparation of standard solutions, volumetric analysis – acid-base titration, volumetric analysis – precipitation reaction, volumetric analysis – oxidation -reduction reaction,
Handling and setting of different types of microscopes (Dissection microscopes, stereo binocular microscopes, research microscopes, phase contrast microscopes), Study of structure, function and usage of laminar flow, autoclave, oven, microwave oven, centrifuge, incubator, micrometers both ocular and stage, vernier caliper and haemocytometer, PCR machine, pH meter, gel electrophoresis; Familiarizing microbiological techniques (identification, isolation, inoculation, culturing and staining), entomological techniques (collection, rearing and pinning of insects and mites), preservation of disease specimens, insects and mite specimens, preparation of temporary and permanent slides</td></tr>
<tr><td>Teaching and Learning Methods / Activities</td><td>Laboratory practical (individual and group activities), discussions</td></tr>
<tr><td>Evaluation</td><td>Practical<table><tr><td>Formative assessment (30%)</td><td>Summative Assessment (70%)</td></tr><tr><td>Laboratory reports 20%
Assignments 10%</td><td>laboratory test -
spot -
Oral -</td></tr></table></td></tr>
<tr><td>Recommended Readings</td><td>1. Bonner, P.L.R. and Hargreaves A.J. (2011). Basic Bioscience Laboratory Techniques: A Pocket Guide, Wiley-Blackwell publishing
2. Cappuccino, J. and Sherman, N. (2004). Microbiology: A Laboratory Manual. 7th Edition. Benjamin Cummings.
3. Chopra, S.L. and Kanwar, J.S. (1999). Analytical Agricultural Chemistry. 4th Edition. Kalyani publishers, New Delhi.
4. Gupta, A.K. and Varshney, M.L. (1994). Practical manual for Agricultural Chemistry. Kalyani puplishers, New Delhi.
5. Seidman, L.A. and Moore, C.J. (2000). Basic Laboratory Methods for Biotechnology. Benjamin Cummings
6. Singh, K. and Sharma, M. (2018). Concept Of Laboratory Techniques In Biology, Brillion Publishing</td></tr>
</table>

Course Contents for First Year First Semester

Course Title	**Principles of Crop Production**
Course Code	**AG 11013**
Credit value	**03**
Core / Elective	Core

<table>
<tr><td>Prerequisite</td><td colspan="4">None</td></tr>
<tr><td rowspan="2">Notional hours</td><td>Theory</td><td>Practical</td><td colspan="2">Independent learning</td></tr>
<tr><td>30</td><td>30</td><td colspan="2">90</td></tr>
<tr><td>Objectives/s:</td><td colspan="4">Impart the student with the knowledge and skill on basic principles of crop production, crop management practices, influence of various climatic factors on crop establishment, seed physiology, flowering physiology and more concepts related to agronomy.</td></tr>
<tr><td>Intended Learning Outcomes</td><td colspan="4">• Recall the factors influence on crop production
• Relate the growth analysis to yield parameters
• Identify and describe the functions of meteorology instruments
• Classify the agro ecological regions of Sri Lanka
• Describe the significance of measurement of climate parameters to crop productivity
• Elaborate the importance of quality parameters of seeds on crop establishment
• Illustrate the importance of flowering physiology to fruit formation
• Discuss about the different methods of propagation
• Explain the importance of weed management in agriculture
• Demonstrate the importance of plant growth regulators in crop production</td></tr>
<tr><td>Detailed Syllabus / Course Content</td><td colspan="4">Theory
Introduction to crop production, Plant growth and growth indices, Introduction to climatology, Agro-meteorology and agro ecological regions of Sri Lanka, Seed physiology, Flowering physiology, Plant propagation, Weed management and Plant growth regulators.

Practical
Land preparation, preparation of plots, layout of the design and field planting, Planting of monocot and dicot seeds to study the growth performance of plant, Identify the meteorological instruments and their functions, Seed purity test and calculation of seed germination percentage,
Testing seed vigour and viability test, Testing seed dormancy and dormancy breaking mechanisms, Identify fruit types - climacteric and non-climacteric fruits, Application of plant growth regulators, Identify the common weeds in the field and classify them based on their morphology, Plant propagation by using cuttings and layering, Budding and grafting, Propagation of plants by using specialized organ, Preparation of stock solution and media for in vitro propagation, Preparation of explant, sterilization and in vitro propagation of plants</td></tr>
<tr><td>Teaching and learning methods</td><td colspan="4">Lectures, tutorials, laboratory works, field practical and field visits</td></tr>
<tr><td rowspan="2">Evaluation</td><td colspan="2">Theory (67%)</td><td colspan="2">Practical (33%)</td></tr>
<tr><td>Formative assessment (30%)</td><td>Summative Assessment (70%)</td><td>Formative assessment (30%)</td><td>Summative Assessment (70%)</td></tr>
</table>

	Quiz- 10% In Class Test -15% Assignment/ Presentation -5%	Three hours Five out of six questions	Field practical records - 20 % Field visit Reports - 10 %	Practical Exam - 20 % Spot - 30 % Oral - 20 %
Recommended readings	1. Reddy, S.R. and Nagamani, C. (2018). *Principles of crop production*. New Delhi: Kalyani publication. 2. Bonan. and Gordon. (2016). *Ecological climatology: Concepts and applications*. 3rd Ed. New York: Cambridge unity press. 3. Kees Stigter, C. J. (2010). Applied Agrometeorology. Springer. 4. Gupta, O.P. (2007). *Fundamentals of weed science*. India: Agrobios. 5. Vanagamudi, K. (2006). *Advances in seed science and technology*. India: Agrobios. 6. Kinet, J.-M., Sachs, R.M., & Bernier, G. (Eds.). (1985). The Physiology of Flowering: Volume III. The Development of Flowers: Volume III: The Development of Flowers (1st Ed.). CRC Press. 7. Sharma, R.R. (2004). *Plant propagation and plant nursery management*. Charbag International book distributing. 8. Srivastava, L. M. (2002). Some special aspects of plant growth and development. In L. M. B. T.-P. G. and D. Srivastava (Ed.), Plant Growth and Development. Academic Press.			

Course Title	**Principles of Animal Production**		
Course Code	**AS 11012**		
Credit Value	**02**		
Core/Elective	Core		
Prerequisite	None		
Notional hours	Theory	Practical	Independent learning
	23	15	62
Objective/s	Impart knowledge on the role of livestock in Sri Lanka, current status of livestock sector in Sri Lanka, major agro climatic zones, livestock farming systems, livestock industries, institutions involved in livestock development, livestock breeds and their characteristics, feed stuff and their resources, basics of management tools, importance of crop livestock integration and basic concepts of planning a farm and conducting a farm survey		
Intended Learning Outcomes	• Describe the needs of developing livestock sector in Sri Lanka. • Distinguish the major agro ecological zones for livestock production and farming systems. • Discuss the features of livestock and poultry industries • Explain the role of institutions on livestock development • Summarize the concepts of crop and livestock integration • Design a small farm		

<table>
<tr><td></td><td colspan="4">

- Plan a simple farm survey
- Identify livestock and poultry breeds
- Classify different feed stuff
- Evaluate the economic status of an integrated farm
-

</td></tr>
<tr><td>Detailed syllabus</td><td colspan="4">Theory
Present status of livestock and poultry sector, agro climatic zones, farming systems, livestock industries, institutions involved in livestock development, livestock breeds and their characteristics, feed stuff and their resources, basics of management tools, crop livestock integration and basic concepts of planning a farm and conducting a farm survey

Practical
Identification of livestock and poultry breeds; Crop and livestock integration; Basic aspects of animal feedstuff; Study visit to get practical knowledge on crop livestock integration, livestock Cooperative Societies, Livestock Breeders Cooperative Society, organizational setup and production aspects, farm evaluation.</td></tr>
<tr><td>Teaching and Learning Methods / Activities</td><td colspan="4">Lectures, practical, tutorials, field visits and assignments</td></tr>
<tr><td rowspan="2">Evaluation</td><td colspan="2">Theory (75%)</td><td colspan="2">Practical (25%)</td></tr>
<tr><td>Formative Assessment (30%)</td><td>Summative Assessment (70%)</td><td>Formative Assessment (30%)</td><td>Summative Assessment (70%)</td></tr>
<tr><td></td><td>Quiz- 10%
In Class Test- 15%
Presentation, (Proposal) and Assignment -5%</td><td>Two hours
Four out of five questions</td><td>Practical reports - 10%
Field trip reports - 10%
Field Assignments - 10%</td><td>Practical exam - 30%
Spot - 30%
Oral - 10%</td></tr>
<tr><td>Recommended Readings</td><td colspan="4">1. Field, T.G. (2020). Scientific farm animal production : an introduction to animal science. Hoboken, New Jersey: Pearson Education, Inc
2. Presicce, G.A. (2017). The buffalo (Bubalus bubalis) : production and research. Sharjah, Uae: Bentham Science Publishers.
3. Flanders, F.B. and Gillespie, J.R. (2016). Modern livestock and poultry production. Boston, Ma: Cengage Learning.
4. Ronald Kay, William Edwards and Patricia Duffy. (2011) Farm management. 7th Edition. Mcgraw-hill science/engineering/math
5. Taylor, R.E. and Field, T.G. (2011) Scientific Farm Animal Production: An Introduction to Animal Science. 10th Edition. Prentice Hall.
6. Phillips, C.J.C. (2009) Principles of Cattle Production. CSIRO Publishing.</td></tr>
</table>

Course Title	**Cell Biology and Crop Botany**

<table>
<tr><td>Course Code</td><td colspan="4">AB 11012</td></tr>
<tr><td>Credit Value</td><td colspan="4">02</td></tr>
<tr><td>Core/Elective</td><td colspan="4">Core</td></tr>
<tr><td>Prerequisite</td><td colspan="4">None</td></tr>
<tr><td rowspan="2">Notional hours</td><td>Theory</td><td colspan="2">Practical</td><td>Independent learning</td></tr>
<tr><td>15</td><td colspan="2">30</td><td>75</td></tr>
<tr><td>Objective/s</td><td colspan="4">Impart knowledge on the structure of prokaryotic, eukaryotic cells, virus and viroids, structure and function of different cell organelles and the basic morphology and anatomy of the important plant families and field level identification of plants belonging to different families and their economic usage.</td></tr>
<tr><td>Intended Learning Outcomes</td><td colspan="4">● Outline the terminologies in cell biology.
● Describe the different cell organelles and their functions.
● Demonstrate the botany of the economically important plant families.
● Distinguish the plants using morphological variation
● List out the use of medicinal plants in various avenues</td></tr>
<tr><td>Detailed syllabus</td><td colspan="4">Theory
Study the structural characters of prokaryotic cell, eukaryotic cell (Plant and Animal), viruses and viroids. Study the Structure and function of following cell organelles: cell wall, cell membrane, nucleus, mitochondria, chloroplast, ribosome, golgi apparatus, lysosome, micro bodies, structure and function of DNA and RNA, details of different cell division process, mitosis and meiosis, Principle of plant taxonomy, Species concept and plant nomenclature, Morphological characters of agricultural important plant families, Botany of multipurpose crops and medicinal plants and their usage

Practical
Cell division: Mitosis, Meiosis; Differentiation of dicots and monocots , observation of plant species in field; description of stem, leaf, flower/inflorescence, floral diagram, family characters of Fabaceae, Caesalpineacease, Mimosaceae, Brassicaceae, Malvaceae, Theaceae, Cucurbitaceae, Caricaceae, Solanaceae, Zingeberaceae, Euphorbiaceae, Poaceae, Rubiaceae, Arecaceae, Rutaceae, Musaceae, identifying and economic usage of different family crops, medicinal plants and their uses and multipurpose tree species.</td></tr>
<tr><td>Teaching and Learning Methods / Activities</td><td colspan="4">Lectures (Physical mode: classroom, Online mode: through Zoom, LMS,
• Group discussion
• Assignments</td></tr>
<tr><td rowspan="3">Evaluation</td><td colspan="2">Theory (50%)</td><td colspan="2">Practical (50%)</td></tr>
<tr><td>Formative Assessment (30%)</td><td>Summative Assessment (70%)</td><td>Formative Assessment (30%)</td><td>Summative Assessment (70%)</td></tr>
<tr><td>Quiz- 10%
In Class Test – 15%</td><td>Two hours</td><td>Practical record - 20%</td><td>Practical Exam - 30%</td></tr>
</table>

	Presentation/ Assignment -5%	Four out of five questions	Field Visit report - 10%	Spot - 30% Oral -10%
Recommended Readings	1. Randy wayne. (2009). Plant cell biology. Elsevior 2. Bruce Alberts, Dennis Bray, Karen Hopkin and Alexander Johnson. (2009). Essential cell biology. Garland science 3. Chanda, S. (2000). Simplified course in botany. S.Chand and Company ltd, New Delhi. 4. Krishnaswamy, R. (1998). Science in cell. Kalyani publications, New Delhi. 5. Thomas, D., Pollard, M.D., William C., Earnshaw and William, C. (2004). Cell Biology. Elsevier Science Health Science division. 6. Ralph Taggart. (2004). Cell Biology & Genetics, Thomson Learning. 7. Sneddon and Robert. (2004). Cell Division and Genetics. Heinemann Educational Books Publisher.			

Course Title:	**Nature of soils**		
Course Code:	**SS 11012**		
Credit Value:	**02**		
Core/ Optional	Core		
Prerequisite	None		
Notional Hours	Theory	Practical	Independent Learning
	15	30	55
Course Aim	Furnish students the scientific concept of soil, its formation and composition, different types of minerals and rocks that form soil, the factors and processes of soil formation and to familiarize different soil sampling techniques and handling of sampling equipment.		
Intended Learning Outcomes	• Describe the composition and functions of soils in the eco-system. • Classify the types of rocks and minerals through their identification • Differentiate different properties of minerals and rocks • Contrast the weathering processes of rocks and different parent materials • Discuss the factors and processes of the formation of different types of soils • Contrast different horizons of soil profile • Choose soil augers for different purposes • Demonstrate sampling and handling of soils for different analytical purposes		
Detailed Syllabus	**Theory** Role of soil in our ecosystem, composition and phases of soil, formation, classification and properties of minerals, types of rocks: igneous, sedimentary, metamorphic, their formtion, classification and properties, factors and processes of rock weathering, rocks of Sri Lanka, types of		

<table>
<tr><td></td><td colspan="4">parent material, soil genesis processes, factors of soil formation, soil profile description.

Practical
Study of physical properties of minerals such as structure, cleavage fracture, luster, colour, streak, hardness and specific gravity. Study the classification of rock forming minerals and the properties and characteristics of different kinds of rocks; igneous rocks, sedimentary rocks, metamorphic rocks. Study of rocks of Sri Lanka, Study of soil sampling equipment, Collection and preparation of soil samples for analysis</td></tr>
<tr><td>Teaching /Learning Methods</td><td colspan="4">Interactive lectures, Think pair share learning, fish bowl learning, Jig-zaw learning, Group Discussions, group presentations, laboratory practical, field practical</td></tr>
<tr><td rowspan="2">Evaluation</td><td colspan="2">Theory (50%)</td><td colspan="2">Practical (50%)</td></tr>
<tr><td>Formative Assessment (30%)</td><td>Summative Assessment (70%)</td><td>Formative Assessment (30%)</td><td>Summative Assessment (70%)</td></tr>
<tr><td></td><td>Quiz- 10%
In Class Test – 15%
Assignment/ Presentation -5%</td><td>Two hours
Four out of five questions</td><td>Practical records – 20%
assignments-10%</td><td>Spot - 50%
Oral - 20%</td></tr>
<tr><td>Recommended Readings</td><td colspan="4">Hoiberg, D. H. (2011). Rocks and Minerals. Chicago Encyclopaedia Britannica.
Pellant, C. (2000). Rocks and Minerals.London Dorling Kindersley.
Huang, P. M., Yuncong, L. and Malcolm, E. S. (2012). Handbook of soil sciences: properties and processes. 2nd edition. Boca Raton CRC Press
Brady,N.C Weil,R.R (2002). The Nature and Properties of soil, 13th edition, Prentice Hall, New Jersey.
Nahon, D. B. (1991). Itroduction to the petrology of soils and chemical weathering. New york John wiley.
Cooray,P.G (1984). An Introduction to the Geology of Sri Lanka (Ceylon), 2nd Edition, National museum of Sri Lanka, Sri Lanka.</td></tr>
</table>

<table>
<tr><td>Course Title:</td><td colspan="3">Applied Hydrology and Engineering Drawings</td></tr>
<tr><td>Course Code:</td><td colspan="3">AE 11012</td></tr>
<tr><td>Credit Value:</td><td colspan="3">02</td></tr>
<tr><td>Core/ Optional</td><td colspan="3">Core</td></tr>
<tr><td>Prerequisite</td><td colspan="3">None</td></tr>
<tr><td rowspan="2">Notional Hours</td><td>Theory</td><td>Practical</td><td>Independent learning</td></tr>
<tr><td>15</td><td>30</td><td>55</td></tr>
<tr><td>Objective/s</td><td colspan="3">Provide operational and mechanical skills of drawings in order to develop various engineering concepts for practical applications and to understand</td></tr>
</table>

<table>
<tr><td></td><td colspan="4">basic concepts of hydrological cycle and the fundamentals of hydrological process in the nature in order to develop strategies for the sustainable use of water.</td></tr>
<tr><td>Intended Learning Outcomes</td><td colspan="4">• Describe the principles of hydrological processes.
• Explain the importance of hydrological cycle.
• Demonstrate isometric projections, orthographic projections and their applications.
• Develop drawings maps, sectional views and cross sectional views of blocks and engine spares.
• Apply concepts of cam and ellipse to the real word scenarios.</td></tr>
<tr><td>Detailed syllabus</td><td colspan="4">Theory
Hydrologic cycle, Human Influences on Hydrological Cycle, Principles of Formation of Rainfall, Forms of Precipitation, Artificially Induced Precipitation, Types of Precipitation, Sri Lankan Pattern of Rainfall, Rainfall Data Analysis, Interception, Measurement of Interception, Factors Affecting the Amount of Interception, Calculation of Interception, Infiltration, Factors Affecting the Rate of Infiltration and Calculation of Filtration Rate, Measurements of Runoff, Factors Affecting the Amount of Runoff and Calculation of Runoff, Stream Flow, Hydrograph, Hydrograph Separation, Derivation of Unit Hydrograph, and Streamflow Measurements.

Practical
Different Types of Rainfall Meter, Mantling and Dismantling of Rainfall Meters, Measurement of Precipitation, Measurement of Interception, Rainfall Chart Analysis, Streamflow Measurements, Introduction to Drawing Instrument, Drawing Sheet Alignment, Projection Symbol Development, Drawing Lines, Introduction to Drawing Views (Types of Lines, Lettering, Outlines, Arrowheads, Sketching and Spacing), Orthographic Projection of1st Angle, Orthographic Projection of 3rd Angle, Isometric Projection, Sectional Drawings, Cam drawing, Ellipse construction and Its methods.</td></tr>
<tr><td>Teaching and Learning/Methods / Activities</td><td colspan="4">Lectures, Tutorials, Assignments and Practical.</td></tr>
<tr><td rowspan="3">Evaluation</td><td colspan="2">Theory (50%)</td><td colspan="2">Practical (50%)</td></tr>
<tr><td>Formative Assessment (30%)</td><td>Summative Assessment (70%)</td><td>Formative Assessment (30%)</td><td>Summative Assessment (70%)</td></tr>
<tr><td>Quiz- 10%
In Class Test - 15%
Assignment/ Presentation -5%</td><td>Two hours Four out of five questions</td><td>Practical Records – 20%
Assignments- 10%</td><td>Practical exam -30%
Spot -30%
Oral - 10%</td></tr>
<tr><td>Recommended Readings</td><td colspan="4">1. Ghanshyan, D. (2000). Hydrology and Soil Conservation. Prentic Hall of India
2. Ienka, D. (1998). Climates weather and corps in India. kalyani publishers New Delhi.
3. Mavi, H.S. (1996). Introduction to Agro meteorology. 2nd edition oxford & IBH Publishing co.pvt. Ltd., New Delhi.</td></tr>
</table>

	4. Sharma, R.K. (1993). A text book of hydrology and water resources. Shriganesh offset Press, Shahdara, Delhi. 5. Wanielista, M.P. (1990). Hydrology and water quality control. John Wiley and sons Newyork.

Course Title	**Principles of Micro and Macroeconomics**		
Course Code	**EC 11012**		
Credit Value	**03**		
Core/Elective	Core		
Prerequisite	None		
Notional hours	Theory	Practical	Independent learning
	45		105
Objective/s	Impart the students with knowledge to appreciate the workings of real and money markets, the nature of equilibrium in each market, and the role of macroeconomic policies that affect deficits, inflation and growth of per capita income		
Intended Learning Outcomes	• Explain the meanings of demand, supply, market equilibrium price, elasticity of demand and supply, consumer surplus and producer surplus. • Demonstrate how production functions and production costs behave when firms alter input levels and production levels. • Estimate profit-maximizing output, input and price levels for firms operating under various market structures • Describe the market structures- pure competition, monopoly, monopolistic competition and oligopoly, • Describe the basic forces behind the economic growth and fluctuation • Illustrate how fiscal and monetary policy attempt to smooth out economic fluctuations, curb inflation, and create jobs.		
Detailed syllabus	Topics include Limits, Alternatives, Choices, Demand, Supply, Market equilibrium, Elasticity, Consumer Surplus, Producer Surplus, Consumer Behavior, Costs of Production, Pure Competition, Pure Monopoly, Monopolistic Competition and Oligopoly, Gross Domestic Output, National Income, Economic Growth, Business Cycles, Unemployment and Inflation, Basic Macroeconomic relationships, The Aggregate Expenditure Model, Aggregate Demand, Aggregate Supply, Fiscal Policy, Deficits, Money Creation, Interest rates, Monetary Policy,		
Teaching and Learning Methods / Activities	Lectures, tutorials and assignments		
Evaluation	Theory		
	Formative Assessment (30%)	Summative Assessment (70%)	

	Quiz- 10% In Class Test – 15% Assignment/ Presentation -5%	Three hours 40 MCQ and Three out of four essay questions
Recommended Readings	1. Frank, R.H. and Bernanke, B.S. (2007). Principles of Micro Economics. McGraw- Hill. 2. Mankiw, G. (2007). Macro Economics. Thomson south-western, USA 3. Hall, R.E. and Taylor, J.B. (1988). Macro Economics. W.W. Norton & Company, New York	

Course Contents for First Year Second Semester

Course Title	**Cereal Crops Production**		
Course Code	**AG 12012**		
Credit value	**02**		
Core / Elective	Core		
Prerequisite	None		
Notional hours	Theory	Practical	Independent learning
	20	20	60
Objectives/s:	Impart knowledge and skills on cultivation practices by adopting improved crop management practices to increase the production of cereal crops commonly grown in Sri Lanka.		
Intended Learning Outcomes	• Recall the importance of cereal crops • Describe the effect of climatic and soil conditions on crop productivity of cereal crops • Distinguish different growth stages of important cereal crops and their influence on crop yield • Apply the recommended crop management practices for the cultivation of cereal crops in the field • Discuss different yield components of cereal crops and their significance on yield estimation		
Detailed Syllabus	**Theory** Introduction to cereal crops such as rice, maize, sorghum, finger millet, common millet, foxtail millet, pearl millet and Kodo millet, Environmental condition and varieties of cereal crops, Growth stages of cereal crops, Cultural practices for cereal crops and Yield components of cereal crops. **Practical** Identification of varieties using seed samples - paddy, maize and other cereal crops, Different paddy nursery preparation, Paddy cultivation in the field – direct seeding and transplanting, Cultivation of maize and sorghum in the field, Nursery preparation and field planting of finger millet, Establishing small plots of other millet crops in the field, Study of morphological characters of different cereal crops and their varieties, Managing cereal crops at field using appropriate agronomic practices,		

<table>
<tr><td></td><td colspan="4">Estimation of yield using different field sampling methods and Practice suitable post harvesting operations and storage</td></tr>
<tr><td>Teaching and learning methods</td><td colspan="4">Lectures, tutorial, group discussion, e-resources, learning management systems, laboratory and field practical</td></tr>
<tr><td rowspan="3">Evaluation</td><td colspan="2">Theory (67%)</td><td colspan="2">Practical (33%)</td></tr>
<tr><td>Formative Assessment (30%)</td><td>Summative Assessment (70%)</td><td>Formative Assessment (30%)</td><td>Summative Assessment (70%)</td></tr>
<tr><td>Quiz- 10%
In Class Test– 15%
Assignment/ Presentation -5%</td><td>Two hours
Four out of five questions</td><td>Field practical records - 20 %
Field visit reports - 10 %</td><td>Practical exam - 20 %
Spot -30 %
Oral- 20 %</td></tr>
<tr><td>Recommended Readings:</td><td colspan="4">1. Acquaah, G. (2015). Principles of crop production theory, techniques and technology, First edition. ISBN 978-93-325-5518-1.
2. Danforth, A.T. (2011). Corn Crop Production: Growth, Fertilization and Yield (Agriculture Issues and Policies). Nova Science Publishers.
3. Singh, N.P. and Singh, R.A. Scientific crop production, First edition, pp. 95-164. ISBN 81-272-0631-X.
4. Singh, S.S. (1998). Crop management under irrigated and rainfed conditions, Third revised edition. ISBN 81-7096-977-8.
5. Seetharam, A., Riley, K.W. and Harlnarayans, G. (1986). Small millets in global agriculture, Oxford and IBM publication, New Delhi.
6. FAO (*Food and Agriculture Organization*). (*1981). Cereal and grain-legume seed processing*. Technical Guidelines. *FAO*, Rome, Italy.</td></tr>
</table>

<table>
<tr><td>Course Title</td><td colspan="3">Anatomy and Physiology of the Farm animals</td></tr>
<tr><td>Course Code</td><td colspan="3">AS 12012</td></tr>
<tr><td>Credit Value</td><td colspan="3">02</td></tr>
<tr><td>Core/Elective</td><td colspan="3">Core</td></tr>
<tr><td>Prerequisite</td><td colspan="3">None</td></tr>
<tr><td rowspan="2">Notional hours</td><td>Theory</td><td>Practical</td><td>Independent learning</td></tr>
<tr><td>23</td><td>15</td><td>62</td></tr>
<tr><td>Objective/s</td><td colspan="3">Impart knowledge and basic understanding of the anatomy and physiology of livestock and poultry. It deals with comparative anatomy and physiology of different livestock and poultry.</td></tr>
<tr><td>Intended</td><td colspan="3">• Describe the physiology of different systems of livestock and</td></tr>
</table>

<table>
<tr><td>Learning Outcomes</td><td colspan="4">poultry
• Identify and locate organs in carcasses of farm animals
• Identify histological sections of various animal tissues
• Summarize the environmental factors affecting animal production
• Exemplifying the comparative anatomy of livestock and poultry</td></tr>
<tr><td>Detailed syllabus</td><td colspan="4">Theory
Homeostasis of animal body, Anatomy and Physiology of digestive system and reproductive system of ruminants and monogastric animals, Anatomy and Physiology of nervous system, circulatory system, and mammary gland, Animal environmental physiology

Practical
Getting physiological parameters of farm animals, observing histological slides under microscope, dissection of ruminant and monogastric animals, tissue processing, gross and internal anatomy of various systems of farm animals, visiting abattoir to study tissues, organs, systems, and external anatomy.</td></tr>
<tr><td>Teaching and Learning Methods / Activities</td><td colspan="4">Lectures, practical, tutorials, field visits and assignments</td></tr>
<tr><td rowspan="3">Evaluation</td><td colspan="2">Theory (75%)</td><td colspan="2">Practical (25%)</td></tr>
<tr><td>Formative Assessment (30%)</td><td>Summative Assessment (70%)</td><td>Formative Assessment (30%)</td><td>Summative Assessment (70%)</td></tr>
<tr><td>Quiz- 10%
In Class Test– 15%
Assignment/ Presentation -5%</td><td>Two hours
Four out of five questions</td><td>Field practical records – 20%
Field visit reports – 10%</td><td>Practical exam -30%
Spot - 30%
Oral -10%</td></tr>
<tr><td>Recommended Readings</td><td colspan="4">1. Kahn, C.M. (2010). The merck veterinary manual. 10th Edition. Merck.
2. Dyce, K.M., Mrcvs, S.B.S.C., Wolfgang, O. Sack dr. Med. Vet and Wensing, C.J.G. (2009). Textbook of veterinary anatomy. 4th Edition. Saunders, China.
3. Frandson, R.D., Lee wilke, W. and Annadee fails. (2009). Anatomy and physiology of farm animals. 7th Edition. Wiley-blackwell.
4. Akers,M.R. and Denbow, D.M. (2008). Anatomy and physiology of domestic animals. 1st Edition. Blackwell publishing.
5. Michael akers, R. and Michael denbow, D. (2008). Anatomy and physiology of domestic animals. 1st Edition. Wiley-blackwell.
6. James G. Cunningham dvmphd. (2007). Textbook of veterinary physiology. 3rd Edition. Saunders, China.
7. Peter G.Jackson G. bvm& s ma dvm& s frcvs. (2004). Handbook of veterinary obstetrics. 2nd Edition. Saunders ltd, China.
8. Frandsonannadeefails, R.D. and Lee wilke W. (2003). Anatomy and physiology of farm animals. 6th Edition. Lippincott williams& Wilkins.</td></tr>
</table>

<table>
<tr><td>Course Title</td><td colspan="3">Plant Physiology and Environmental Biology</td></tr>
<tr><td>Course Code</td><td colspan="3">AB 12012</td></tr>
<tr><td>Credit Value</td><td colspan="3">02</td></tr>
<tr><td>Core/Elective</td><td colspan="3">Core</td></tr>
<tr><td>Prerequisite</td><td colspan="3">None</td></tr>
<tr><td rowspan="2">Notional hours</td><td>Theory</td><td>Practical</td><td>Independent learning</td></tr>
<tr><td>23</td><td>15</td><td>62</td></tr>
<tr><td>Objective/s</td><td colspan="3">Impart knowledge on the basic physiology of plants and its interaction with associated environment to maintain or modify different physiological functions associated for food production, growth and development, and adaptation to different stress conditions experienced during growth and development in different ecosystems and appropriate manipulation of ecosystem to enhance the sustainable agricultural production</td></tr>
<tr><td>Intended Learning Outcomes</td><td colspan="3">● Outline the physiological functions of plants
● Describe the basic physiological functions of plants
● Measure the environmental factors influence plants growth
● Connect plant physiological functions with plant productivity
● Identify the major ecosystems of the biomes
● Demonstrate the characteristic features of the ecosystems
● Explain the problems associated with pollution and wastes</td></tr>
<tr><td>Detailed syllabus</td><td colspan="3">Theory
Photosynthesis, photochemical and photosynthetic electron transport, Concepts of CO_2 fixation in plants.C3, C4 and CAM pathways, Photorespiration, Environmental and physiological control of photosynthesis, plant water relationship, Phloem transport, Energetic phases in respiration, Water potential gradients, Xylem transport, Transpiration. Biotic communities, Tropic structure of the community, Community stability, Ecotypes and ecological indicators, Components of the ecosystem, Aquatic ecosystem and terrestrial ecosystem, agro ecosystem and its consequences, waste lands and their management, Pollution and control measures. Study the plant adaptations, Hydrophytes, Mesophytes, Xerophytes, Determination of cell, osmosis, determination of water potential of a cell, types of pollutants, impact of pollution

Practical
Demonstration of photosynthesis by O_2 release, CO_2 uptake, Light requirement, Chlorophyll requirement Starch production, demonstration of respiration by release of heat, CO_2, uptake of O_2, water potential parameters, composition of transpiration by four leaf experiment, Photometer experiment, $CoCl_2$ paper method, Community structure by minimum quadrate method, frequency and percentage and relative frequency, Density and relative density of the canopy, field visits to different terrestrial and aquatic ecosystems.</td></tr>
</table>

<table>
<tr><td>Teaching and Learning Methods / Activities</td><td colspan="4">Lectures (Physical mode: classroom, Online mode: through Zoom, LMS, Group discussion, Assignments</td></tr>
<tr><td rowspan="3">Evaluation</td><td colspan="2">Theory (75%)</td><td colspan="2">Practical (25%)</td></tr>
<tr><td>Formative Assessment (30%)</td><td>Summative Assessment (70%)</td><td>Formative Assessment (30%)</td><td>Summative Assessment (70%)</td></tr>
<tr><td>Quiz- 10%
In Class Test– 15%
Assignment -5%</td><td>Two hours
Four out of five questions</td><td>Field practical records -20%
Field visit reports -10%</td><td>Practical exam -30%
Spot -30%
Oral - 10%</td></tr>
<tr><td>Recommended Readings</td><td colspan="4">1. Lincoln Taiz and Eduardo Zeiger (2010). Plant Physiology. Sinauer Associates, Inc.
2. Verma, P.S. and Agarwal, S. (1999). Concept of ecology, Kalyani publications, New Delhi.
3. Krishnaswamy, R. (2000). Basic crop physiology. Kalyani publications, New Delhi.
4. Nobel, P.S. (2004). Biophysical plant Physiology & Ecology. W.H. Freeman & Co.(sd).
5. Dubey, S.K. (2002). Environmental Biology. Kalyani publications. New Delhi, India
6. Pandey, B.N., Choudhary, R.K. and Singh, B.K. (2002). Biodiversity Conservation; environmental Pollution and Ecology. New Delhi, India
7. Prasad, S.N. (2000). Environmental biology. Delhi Campus, India</td></tr>
</table>

<table>
<tr><td>Course Title</td><td colspan="3">Soil properties and processes</td></tr>
<tr><td>Course Code</td><td colspan="3">SS 12013</td></tr>
<tr><td>Credit Value</td><td colspan="3">03</td></tr>
<tr><td>Core/Elective</td><td colspan="3">Core</td></tr>
<tr><td>Prerequisite</td><td colspan="3">None</td></tr>
<tr><td rowspan="2">Notional hours</td><td>Theory</td><td>Practical</td><td>Independent learning</td></tr>
<tr><td>30</td><td>30</td><td>90</td></tr>
<tr><td>Objective/s</td><td colspan="3">Introduce students the chemical, physical and biological properties and processes of soils, their interactions and influences towards sustainable land managment.</td></tr>
<tr><td>Intended Learning Outcomes</td><td colspan="3">• Compare different physical, chemical and biological properties of soils
• Discuss the influence of differnt factors on each soil property and process
• Recommend appropriate management methods to improve soil properties and processes</td></tr>
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<tr><td></td><td colspan="4">

- Analyze soil properties and processes
- Derive relations among soil properties
- Calculate different aspects related to soil properties
- Interpret analytical results of soils
- Appraise potentials of different soils

</td></tr>
<tr><td>Detailed syllabus</td><td colspan="4">

Theory

Soil physical properties and processes: bulk density and particle density, soil texture, soil structure, soil colour, soil water content, soil water potential, soil moisture retention relationship, soil water movement, porosity and soil air, soil temperature, Soil chemical properties: classification and properties of soil colloids, ion exchange and its importance, soil reaction, soil biological properties such as diversity of soil organisms, soil organic matter and humus, C/N ratio and its significance, factors and practices influencing soil organic matter, role of soil organisms in soil fertility

Practical

Determination of soil physical properties such as bulk density, particle density, soil texture (feel method and pipette method), soil consistency, determination of soil moisture retention relationship, determination of soil organic matter, determination of soil chemical properties such as cation exchange capacity, total exchangeable bases, pH, electrical conductivity and study on the effect of organic matter addition on the activity of microorganisms

</td></tr>
<tr><td>Teaching and Learning Methods / Activities</td><td colspan="4">Interactive lectures, Think-pair-share learning, fish bowl learning, Jig-zaw learning, Group Discussions, group presentations, laboratory practical</td></tr>
<tr><td rowspan="3">Evaluation</td><td colspan="2">Theory (67%)</td><td colspan="2">Practical (33%)</td></tr>
<tr><td>Formative Assessment (30%)</td><td>Summative Assessment (70%)</td><td>Formative Assessment (30%)</td><td>Summative Assessment (70%)</td></tr>
<tr><td>Quiz- 10%
In Class Test – 15%
Assignment/ Presentation -5%</td><td>Three hours
Five out of six questions</td><td>Practical Records/ Assignments-30%</td><td>Practical exam- 40%
Spot- 20%
Oral 10%</td></tr>
<tr><td>Recommended Readings</td><td colspan="4">

1. Brady,N.C Weil,R.R (2002). The Nature and Properties of soil, 13th edition, Prentice Hall, New Jersey.
2. Huang, P. M., Yuncong, L. and Malcolm, E. S. (2012). Handbook of soil sciences: properties and processes. 2nd edition. Boca Raton CRC Press.
3. Singer,M.J and Munns,D.N (2002). Soils An introduction, 5th edition,Prentice Hall, New Jersey.
4. Miller,R.W and Donahue,R.L (1997). Soil in our Environment, 7th edition, Pentrice-Hall of India (pvt) Ltd.
5. Alan wild. (1993). Soils and the Environment. An Introduction, Cambridge University Press.

</td></tr>
</table>

<table>
<tr><td>Course Title</td><td colspan="4">Principles of Farm machinery</td></tr>
<tr><td>Course Code</td><td colspan="4">AE 12013</td></tr>
<tr><td>Credit Value</td><td colspan="4">03</td></tr>
<tr><td>Core/Elective</td><td colspan="4">Core</td></tr>
<tr><td>Prerequisite</td><td colspan="4">None</td></tr>
<tr><td rowspan="2">Notional hours</td><td>Theory</td><td>Practical</td><td colspan="2">Independent learning</td></tr>
<tr><td>30</td><td>30</td><td colspan="2">90</td></tr>
<tr><td>Objective/s</td><td colspan="4">Provide basic knowledge about the mechanization of farm operations like ploughing, harrowing, sowing, chemical spraying, weed control and harvesting and to provide clear idea about farm power, power sources, function, operation and maintenance of farm equipment and machinery, engine tools, mechanical fastening concepts and maintenance of farm machinery.</td></tr>
<tr><td>Intended Learning Outcomes</td><td colspan="4">● Describe basic engine principles.
● Elaborate mechanization of farm operations.
● Identify appropriate farm tools for farm operations.
● Demonstrate workshop practices.
• Investigate conditions of farm machinery.
• Acquire knowledge on working principles of farm machinery and their maintenance.</td></tr>
<tr><td>Detailed syllabus</td><td colspan="4">Theory
Engine Definition, History of Engine Development, Engine cycle {Two Stroke Engine Cycle (2SE) and Four Stroke Engine Cycle (4SE)}, Gasoline Engine and Diesel Engines, Engine Classification, Engine Systems, Introduction to Tractors, Tillage Engineering and Tillage Implements, Seeders, Sprayers, Harvesters, Engine Troubles and Maintenance, Farm Accidents and Their Prevention, Methods of Mechanical Fastening, Attachment and Detachment of Farm implements.

Practical
Demonstration of Basic Engine Spares, Power Transmission System of 4SE and 2SE, Fuel Transmission System of 4SE and 2SE, Demonstration of 2WT, Demonstration of 4WT, Hydraulic System and Its Components, Lubrication System and Lubricant Selection for Engines, Identification of Primary and Secondary Land Preparation Implements, Demonstration of Sprayers, Demonstration of Seeders and Planters, Demonstration of Ignition System, Demonstration of Engine Tools, Water Pumps, Introduction to Workshop and Workshop Practices, Cutting of Metal, Shaping, Bending, Twisting, Arc Welding, Gas Welding, Argon Welding and Mechanical Fastening.</td></tr>
<tr><td>Teaching and Learning Methods / Activities</td><td colspan="4">Lectures, Tutorials, Assignments and Practical.</td></tr>
<tr><td rowspan="2">Evaluation</td><td colspan="2">Theory (67%)</td><td colspan="2">Practical (33%)</td></tr>
<tr><td>Formative</td><td>Summative</td><td>Formative</td><td>Summative</td></tr>
</table>

	Assessment (30%)	Assessment (70%)	Assessment (30%)	Assessment (70%)
	Quiz- 10% In-class Test - 15% Assignment/ Presentation -5%	Two hours Four out of five questions	Practical records -30%	Written practical - 30% Spot - 30% Oral - 10%
Recommended Readings	1. Khurmi, R.S. and Gupta, J.K. (2002). Theory of mechanics. Eurasia publishing house pvt ltd, New Delhi. 2. Kepner, R.A., Bainer, R. and Barger, E.L. (1987). Principles of Farm machinery. 3rd CBS Publishers and distributors, New Delhi. 3. Srivastava, D.S. (1995). Elements of farm machinery. Oxford and IBH publishing co. pvt. ltd, New Delhi 4. Roth, L.D. and Field. A.E. (1996). Introduction to Agricultural Engineering. 2nd edition CBS publisher and distributors, New Delhi. 5. Donaldson, C., Lecain, G.H. and Goold, V.C. (2002). Tool design. Tata Mcgraw hill publishing company ltd, New Delhi.			

Course Title	**Agricultural Extension and Communication**		
Course Code	**EX 12012**		
Credit Value	**02**		
Core/Elective	Core		
Prerequisite	None		
Notional hours	Theory	Practical	Independent learning
	15 hours	30 hours	55
Objective/s	Develop students' confidence and skills in personal and interpersonal communication. Inculcate effective and successful means and ways of interaction with the public institutions and with the general public specifically with the farming societies		
Intended Learning Outcomes	• Explain the basic concepts of extension, communication, the process of diffusion and adoption, teaching adult • Identify the roles and functions of the extension worker, various extension teaching methods, techniques and approaches • Distinguish adult learning from conventional classroom/ academic learning • Appreciate the indispensable role of communication in extension • Enumerate the principles and approaches of extension		
Detailed syllabus	**Theory** Communication theories and models, Types of communication, Verbal and non-verbal communication, Mass media and organizational communication, Role of information in communication, Effectiveness of communication, The philosophy goals and guiding principles of Extension, Extension models and approaches, Adoption and diffusion of innovations, Group action and participation of community group, Role of community		

<table>
<tr><td></td><td colspan="4">based organizations, Principles of adult education, Planning implementing and evaluation of training program

Practical
The central objective is to provide basic and comprehensive information to students in developing suitable audio visual aid for making effective communication. The use of visual aids, coupled with good public addressing skills, work hand-in-hand to create effective communication. Individual contacts, Farm and home visits, Data collection techniques, Develop skill in writing for rural population, Playing extension task-results demonstrations, Focus group discussion and organizing group activities. Identifying the sites for the development, Program planning and Preparation of questionnaire for need assessment, Preparing interview checklist, Interview techniques and method of surveying. Role of audio-visuals and electronic media in agricultural development, Basic photography, Computer based technology for the production of audio visual aids, Writing for electronic media, Preparation, presentation and evaluation of non-projected aids posters, charts, flash cards, flip book, flannel board, pamphlets, leaflets, folder and booklets, Practice in handling projected aids, Use of radio and television in development program and mass media campaigns, Organizing and storing the collected data</td></tr>
<tr><td>Teaching and Learning Methods / Activities</td><td colspan="4">Lectures, tutorials and assignments</td></tr>
<tr><td rowspan="3">Evaluation</td><td colspan="2">Theory (50%)</td><td colspan="2">Practical (50%)</td></tr>
<tr><td>Formative Assessment (30%)</td><td>Summative Assessment (70%)</td><td>Formative Assessment (30%)</td><td>Summative Assessment (70%)</td></tr>
<tr><td>Quiz- 10%
In Class Test – 15%
Presentation -5%</td><td>Two hours Four out of five questions</td><td>Farm Visit Record -10%
Questionnaire Survey Data entry and Presentation – 20%</td><td>Practical exam – 40%
Preparation and presentation of visual aids (5 Assignments) -20%
Oral - 10%</td></tr>
<tr><td>Recommended Readings</td><td colspan="4">1. Adivireddy, A. (1987). Extension Education. Sree Lakshmi Press.
2. Van Den Ban, W. and Hawkins, H.S. (1996) Agricultural Extension. Oxford ; Malden, MA : Blackwell Science
3. Pett, D.W. (1997). Audio-Visual Communication hand book. Information Collection and Exchange (ICE), Peace Corps, Washington, DC
4. Cees Leeuwis and Anne Van den Ban. (2004). Communication for Rural Innovation: Rethinking Agricultural Extension. Wiley-Blackwell.
5. Agricultural Innovation Systems (2012). An Investment Sourcebook (Agriculture and Rural Development Series). The World Bank Publication.
6. Salvador Flores (2016). Agricultural Extension: Farmer Education</td></tr>
</table>

	and Rural Development, Syrawood Publishing House. 7. Richard West. and Lynn Turner (2018). Introducing Communication Theory. McGraw- Hill Humanities. (6E) 8. Suresh Chandra Babu and P.K.Joshi (2019). Agricultural Extension Reforms in South Asia: Status, Challenges and Policy options, Academic Press 9. Kevin Luis (2021). Fundamental of Agricultural Extension: Extension education and agricultural extension: Meaning, definition, concepts, objectives and principles.

Course Title	**English II**			
Course Code	**AC 12012**			
Credit Value	**02**			
Core/Elective	Core			
Prerequisite	None			
Notional hours	Theory	Practical	Field/ Industrial visits	Independent learning hours
	In-class sessions(compulsory) and Tutorials – 30 hours			(Study in the Library: 30 hours, Learning in Groups: 20 hours, Independent Learning: 20 hours)
Objective/s	Facilitate learners' to achieve higher level of proficiency, so that they will gain the ability to function effectively in communicative contexts:; cope with and engage in day-to-day basic interpersonal communicative events fairly successfully; comprehend long and complex academic texts; listen to lectures/read material comprehend messages therein and take down notes effectively in the relevant context; produce written and spoken discourses relevant to the field of study with substantial grammatical and pragmatic competence; respond to fairly complex spoken discourses.			
Intended Learning Outcomes	• Comprehend complex authentic/authoritative materials of different genres • Identify key and supporting (explicitly and implicitly) given ideas of written academic texts/short audio (lecture)/audio visual text • Construct simple, compound and complex sentences using appropriate tenses, voice and grammatical elements • Respond to multiple contexts of written and spoken discourses • Produce multiple contexts of written and spoken discourses • Describe people, places, tools, objects, processes, graphs, and tables • Make use of cohesive devices appropriately in spoken and written communication			

	• Write five-paragraph academic essays with cohesion and coherence • Apply grammatical rules and mechanics of writing • Synthesize information elicited from different resources • Paraphrase/Summarize simple academic texts • Use in-text citations to authenticate the arguments • Create a references list
Detailed syllabus	**Listening:** Short extracts and longer texts (lectures, dialogues, announcements, talks, news online documentaries, YouTube lecture clips/discussions, etc.); to identify key ideas; supporting details; elicit explicitly and implicitly given messages; understand internal cohesion; following instruction and act upon (e.g. processes of conducting experiments; making a worm farm, vegetable bed, compost; production process etc.) (TOFEL writing question type 2 type of integrative tasks and Dictoglos tasks are recommended) **Speaking:** Simple day-to-day situations both academic and social context at large focusing on making instructions, explaining and describing tools, events and processes; defining terms/phenomena; explaining the functions of objects; asking for explanation and information in the seminar, discussions, conferences and workshops using questions, and responding; asking questions and giving answers in the class, language for peer collaboration and maintaining teacher/peer rapport; making long speeches; expressing and responding to opinions/personal feelings and attitudes; involving in conversations on particular topics and contexts; Preparing and giving PowerPoint Presentations (The contents given for speaking should focus the relevancy to their field of study). **Reading:** Long and complex authentic reading texts relevant to the course of study, letters, emails, reports, memos, advertisements, charts, web pages, magazines, research articles, reports, book index, content pages, dictionary extracts, OER materials, authoritative online resources, etc. with increasing complexity; different Note-taking methods; Cloze-passages; academic texts from the field (to unpack different kinds of paragraphs/essay structures: e.g. topic and thesis statement, supporting ideas, cohesive devices such as transitional words, conjunctions, articles, etc.; Understanding instructional words in testing tools such as examinations/CAs/FEs (Guided reading and Close-reading activities as instructional strategies, Collaborative Strategic Reading approaches are recommended). **Writing:** write short texts describing people, places, objects, instructions, processes, events, graphs, tables using appropriate and fairly correct language. Mind and Concept maps to plan essays. Paragraphs, short essays, email (netiquettes) , note writing, small ads, writing agenda for meetings and functions, leaflets, etc. gap filling exercise with blanks, sentences-completion, sentence-reordering, filling various forms, writing instructions. Different paragraphs: descriptive, discursive, expository, etc. Five paragraph academic essays: unpacking to understand cohesion, coherence, structure, organization, topic sentence, thesis statement, reporting words, hedging language. Constructing different types of academic paragraphs and essays. Essay marking criteria, Editing manual.

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<tr><td></td><td colspan="4">[Use both process writing and product writing as instructional approaches recommended].

Grammar & Vocabulary: Sentences, long texts & exercises focussed on tense, voice, prepositions, articles, etc. Sentences, long texts and exercises on different types of sentences: simple, compound and complex sentences (noun/adjectival/adverbial clauses), if conditionals, (Teachers can use 3 dimensional Grammar Pie that elaborate structure, use and functions of grammar points such as voice, tense, etc. as an instructional approach is recommended). OER material and interactive activities freely available on the web can also be utilized.

Vocabulary - Sentences and complex texts that include words, terminology, register of a relevant field and practice exercises. Should improve not only passive but active vocabulary.</td></tr>
<tr><td>Teaching and Learning Methods / Activities</td><td colspan="4">CLT based illustrated lectures, presentations with interaction/feedback, interactive speaking activities, peer activities for writing, Content Language Integrated Learning (CLIL), Task Based Language Teaching (TBLT)</td></tr>
<tr><td rowspan="5">Evaluation</td><td rowspan="4">In course Assessment</td><td>Note taking from a text
(20 Marks)</td><td>7.5%</td><td rowspan="4">30%</td></tr>
<tr><td>Writing instructional manuals/posters/ flyers/paragraphs on agricultural processes
(20 Marks)</td><td>7.5%</td></tr>
<tr><td>Listening - Note taking from a lecture/ instructions
(20 Marks)</td><td>7.5%</td></tr>
<tr><td>In Class Test
(20 Marks)</td><td>7.5%</td></tr>
<tr><td colspan="3">End Semester Examination:
The question paper for the End Semester examination contains 2 parts. The duration of the written paper is 2 hours and the students are expected to answer all the questions,
Part I: Reading- choosing sub titles for paragraphs, true or false, matching words with similar meanings, skimming and scanning questions, transfer of information, etc. 20 Marks
Grammar & Vocabulary – tenses, voice, prepositions, word order, use of noun clauses, adjectives/adjectival clauses and adverbs/adverbial clauses, etc. 15 Marks</td><td>70%</td></tr>
</table>

	Writing – describing people, places objects, profile writing, note writing, , emails, , short essays & letters, small ads, agenda for meetings, leaflets etc. – 25 Marks **Part I - 60 Marks** **Part II – 40 Marks** Speaking: Presentation/Viva Voce – 15 Marks Listening: 10 Marks Writing portfolio (15 Marks) Total marks: 100 Marks. **(100 marks will be converted to 70 Marks)**	
Recommended Readings	1. Adrian, D. and Christopher, J. (2004). *Listening 1 and 2*. Ninth Imprint. Cambridge: Cambridge University Press. 2. Beglar, D. (2011). *Advanced Listening and note Taking Skills*. 2nd Edition. Mac Grow Hill. 3. Frangoise, G. (2012).*Developing Reading Skills: A Practical Guide to Reading Comprehension Exercises*. Cambridge: Cambridge University Press. 4. Harmer, J and Arnold, J. (2008). *Advanced Speaking Skills*. Longman. 5. Joanne, C. and Stephen, S. (2003). *Speaking 1 and 2*. Eleventh Imprint. Cambridge: Cambridge University Press. 6. John, S. (2013). *The Oxford Guide to Effective Writing and Speaking*. 3rd Edition. Oxford: Oxford University Press. 7. Raymond, M. (2012). *English Grammar in Use Book with Answer: A Self-Study Reference and Practice Book for Intermediate Learners of English*. Cambridge: Cambridge University Press. 8. Richard, H. (2011). *Headway Academic Skills: 3: Listening, Speaking, and Study Skills Student's Book*. Oxford: Oxford University Press. 9. Sarah. P. and Lesley, C. (2013). *Headway Academic Skills: 3: Reading, Writing, and Study Skills Student's Book*. Oxford: Oxford University Press. 10. Tricia, H. (2005). *Writing*. Oxford: Oxford University Press.	