Английский язык для специальных целей. Прикладная математика – 3.
Course Syllabus for «English for Specific Purposes. Applied Mathematics – 3».

<div align="right">Approved by the Academic
Council of SoFL</div>

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No. of credits	3
Contact hours	52
Independent study (hours)	62
Year of study, degree programme	The second year of study,1–3 modules
Study format	Full-time

Abstract

This ESP course aligns with your major in *Applied Mathematics* and successfully integrates the topics necessary for your field into your language learning. It will provide you with extensive practice and expand your vocabulary and language skills, required for both work and studies. The course covers a wide variety of areas, such as linear algebra, mathematical analysis, probability theory and mathematical statistics, numerical algorithms, programming, neural networks, etc.

By the end of this course, you will be able to read professional literature in English, understand lectures and talks on professional topics, work with technical documentation in English, present your knowledge and yourself at a group case interview, speak about the main tools and processes of Maths in English, communicate with your colleagues and classmates about your professional interests. The course is highly recommended for students who aim to pursue a career in the international environment of scientific research, finance, data science, data analytics, information technology, and many others spheres. Whether you want to communicate with potential employers, co-workers, partners or clients, advanced English communication skills can help you achieve your professional goals more effectively.

Learning Objectives

The course pursues the following objectives:
- to improve students' command of English for professional communication;
- to enhance receptive and productive skills related to specific purposes;
- to expand students' knowledge of technical vocabulary in their field of study
- to expand students' knowledge of grammar structures used in their professional area.

Learning Outcomes

Upon completing the course, students will be able to:

- use a range of subject specific grammatical structures appropriately and with considerable flexibility
- understand and use appropriately the range of technical vocabulary and idiomatic expressions common to their area of specialisation.
- follow the essentials of lectures, talks and reports and other forms of academic/professional presentation which are propositionally and linguistically complex.
- follow the discussion on matters related to the field of study; understand in detail the points given prominence by the speaker.
- understand in detail lengthy, complex texts related to their area of specialisation.
- participate in a group case interview, expanding and developing the point being discussed fluently without any support, and handling interjections well.
- give instructions on carrying out a series of complex professional or academic procedures.
- give a clear, well-structured presentation of a complex subject, expanding and supporting points of view at some length with subsidiary points, reasons and relevant examples.
- take a series of follow up questions with a degree of fluency and spontaneity which poses no strain for either him/herself or the audience.
- write a review with appropriate highlighting of significant points and relevant supporting detail.

- write a motivation letter with appropriate register, structure and conventions.

Course Contents

Topic 1. **Basic Concepts and Terminology**
Vocabulary: Arithmetic operations; fractions; shapes; coordinate system; reading and understanding mathematical formulae; proof of theorems. Grammar: Passives.

Topic 2. **Linear Algebra**
Vocabulary: terms and concepts used in this field. Grammar: Nominalization

Topic 3**. Mathematical Analysis**
Vocabulary: terms and concepts used in this field. Grammar: Articles (the specifics of using articles in this field of study).

Topic 4. **Discrete Mathematics**
Vocabulary: terms and concepts used in this field. Grammar: Clauses of purpose, cause and effect.

Topic 5. **Algorithms and Programming**
Vocabulary: terms and concepts used in this field. Grammar: Punctuation. Relative clauses.

Topic 6. **Physics**
Vocabulary: terms and concepts used in this field. Grammar: Reporting. Passive reporting structures.

Topic 7. **Theory of Probability and Mathematical Statistics**
Vocabulary: terms and concepts used in this field. Grammar: Modals (probability, speculation – past and present), cautious language (hedging).

Assessments

The final grade is composed of the following parts: 25% Written Assessment (WA) +20% Oral Assessment (OA) + 25% student Independent Work Assessment /online (IWA) + 30% Final Assessment (FA).

Only overall grade is rounded.

The common mathematical rounding is applied to students' scores.

Written assessment elements can be taken during the course of 10 days after they took place if a student has a medical certificate. The 10-day period starts from the last day of the medical leave. This, however, does not apply to oral assessment and individual work assessment (elements cannot be retaken).

The Final Assessment may be taken again during the retake period. The first retake follows the structure of the Final Assessment. The second retake is conducted using unique Testing and Assessment Materials which cover the materials of the whole course. The grade for the second retake corresponds with the grade for the entire course.

- Written Assessment
Written assessment is conducted in the classroom and cannot be part of homework. Written assessment includes three written assignments: one review on an article, one review on a video-lecture or an interview and one motivation letter. The elements of written assessment cannot be retaken.

REVIEW ASSESSMENT CRITERIA (max 10 points)
Recommended word count – 250-300

Task Response (max 3 points)
3 points – the student fully addresses all parts of the task (writes a title and a catchy introduction which identifies the reviewed item, gives a complete and fair description of the item, makes valid recommendations in conclusion); presents a fully developed position in answer to the question with relevant, fully extended and well supported ideas (presents a thorough discussion);
2 points – the student addresses all parts of the task although some parts may be more fully covered than others (writes a title and a relevant introduction, gives a narrow description, makes

valid recommendations in conclusion); presents a relevant position although the conclusions may be unclear or repetitive; presents relevant main ideas but some may be inadequately developed/unclear;

1 point – the student responds to the task only in a minimal way or the answer is tangential; the format may be inappropriate: the student does not write a title but writes an introduction, gives a short description of the item, makes invalid recommendations in conclusion; the student presents a position but it is unclear; presents some main ideas but they are difficult to identify and may be repetitive, irrelevant or not well supported;

0 points – the student does not adequately address any part of the task: the student does not write an introduction, presents undetailed arguments, neither presents the personal impression nor the verdict; does not express a clear position; presents few ideas which are largely undeveloped or irrelevant.

Coherence and Cohesion (max 2 points)

2 points – the student writes a clearly structured objective review on the item, uses a variety of linking devices which connect the ideas appropriately, organises information in a logical order, uses paragraphing sufficiently;

1 point – the student writes a poorly structured review, uses a limited number of linking devices, does not use paragraphing sufficiently;

0 points – the student does not organise information and ideas logically, fails to use linking devices appropriately or repeats them.

Lexical Resource and Register (max 2 points)

2 points – the student uses a wide range of vocabulary specific to this topic without repetitions, makes 1 lexical or spelling mistake, the review is written in the appropriate register;

1 point – the student uses a limited range of vocabulary, fails to use active vocabulary items, makes 2 lexical or spelling mistakes, the student uses the appropriate register;

0 points – the student uses basic vocabulary, makes 3 or more lexical / spelling mistakes, the student uses an inappropriate register.

Grammatical Range and Accuracy (max 2 points)

2 points – the student uses a variety of complex grammar structures and makes 1 grammar mistake;

1 point – the student uses basic grammar structures and makes 2 grammar mistakes;

0 points – the student makes numerous grammar mistakes which impede understanding.

Punctuation (max 1 point)

1 point – the students may make 1-2 punctuation errors;
0 points – the students makes more than 2 punctuation errors.

MOTIVATION LETTER ASSESSMENT CRITERIA (max 10 points)

Task response (3)	Coherence and Cohesion (2)	Lexical resource and register (2):	Grammatical range and accuracy (2)	Punctuation (1)
All of the four criteria are observed: 1) The letter contains a header, an introduction, a main body, a conclusion and an ending appropriate for a formal letter. 2) The main body defines key skills and illustrates them with specific examples. It demonstrates that the candidate fits for the desired position and explains why. 3) The introduction contains a thesis of the motivation letter. 4) In the conclusion, the student restates his/her interest and shows appreciation.				
1 or 2 of the following criteria have mistakes or are not observed: 1) The letter contains a header, an introduction, the main body, a conclusion and an ending appropriate for a formal letter. 2) The	Proper paragraphing is observed. **AND/OR** There are no mistakes in the register **AND/OR** At least 4 non-basic cohesive devices are used. [1]	4-5 content-specific vocabulary units are used. **AND/OR** There is no more than 1 minor error which does not impede understanding.	There are no more than 2 minor errors.[2] **AND/OR** The student demonstrates clear organization of sentences, shows a variety of structures: at least three of the	

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[1] The following linkers are considered basic cohesive devices: and, but, or, also, so.

[2] Repeated mistakes of the same kind are considered one mistake.

main body includes information about the student's achievements and experience and explains the student's interest in the program/organization). 3) The introduction contains a thesis of the motivation letter. 4) In conclusion, the student restates his/her interest and shows appreciation.			following categories are used: passives, modals, hedges, nominalization, compound sentences.	
3 of the following criteria have mistakes or are not observed: 1) The letter contains a header, an introduction, the main body, a conclusion and an ending appropriate for a formal letter. 2) The main body includes information about the student's achievements and experience and explains the student's interest in the program/organization). 3) The introduction contains a thesis of the motivation letter. 4) In the conclusion, the student restates his/her interest and shows appreciation.	There is one mistake in paragraphing. **AND/OR** There is 1 mistake in the register. **AND/OR** Only 2-3 non-basic cohesive devices are used	2-3 content specific vocabulary units are used. **AND/OR** There are 2-3 errors which do not impede understanding.	There are few errors (3-4). **AND/OR** The student generally demonstrates clear organization of sentences, shows at least some variety of structures: at least two of the following categories are used: passives, modals, hedges, nominalization, compound sentences.	There is no more than 1 mistake in punctuation.

The response is completely unrelated to the task. OR There are mistakes in all of the four criteria: 1) The letter contains a header, an introduction, the main body, a conclusion and an ending appropriate for a formal letter. 2) The main body includes information about the student's achievements and experience and explains the student's interest in the program/organization). 3) The introduction contains a thesis of the motivation letter. 4) In the conclusion, the student restates his/her interest and shows appreciation.	Proper paragraphing is not observed (there is over 1 mistake in paragraphing). **AND/OR** There are 2 or more mistakes in the register. **AND/OR** Only basic cohesive devices are used.	The student shows very little control of content-specific vocabulary: fewer than 2 content specific words/phrases are used. **AND/OR** Mistakes are numerous (4 or more mistakes) **AND/OR** some of the mistakes impede understanding.	Errors are numerous (5 or more) **AND/OR** There are fewer errors but some of them impede understanding. **AND/OR** The student fails to demonstrate clear organization of sentences, no variety of structures.	There are 2 or more mistakes in punctuation.

- Oral Assessment

Oral assessment is conducted in the classroom and cannot be part of homework. Oral assessment includes a presentation with a Q&A session, a group case interview and a pronunciation test on commonly mispronounced words and phrases. The test on commonly mispronounced words is held as follows: before the test students study the list of commonly mispronounced words in Smart LMS. The test in class includes ten words/phrases from the list which the student has to read out loud. For each correctly pronounced word/phrase the student gets 1 point.
The elements of oral assessment cannot be retaken.

PRESENTATION ASSESSMENT CRITERIA (max 10 points)

If the content of the presentation does not relate to the topic, a student receives "0" for the whole presentation.

Task Response (max 3 points):

3 points – the student fully addresses all parts of the task: the presentation corresponds to the chosen topic; it is clearly divided into introduction, main body and conclusion, all content points are covered; introduction contains the purpose and the plan of the presentation, each part of the main body has an explicit pattern of organisation (illustration, cause and effect, comparison, definition, etc.); conclusion includes both summary and the final statement and rounds the presentation of appropriately; presentation contains appropriate references in APA style in speech and slides; various coherence devices are used;

2 points – the student addresses all parts of the task although some parts may be more fully covered than others: the presentation partially corresponds to the topic, it is clearly divided into introduction, main body and conclusion and the parts of the presentation are connected with linking devices; presentation contains appropriate references in APA style in speech and slides;

1 point – the student responds to the task only in a minimal way or the answer is tangential, the format may be inappropriate: the presentation partially corresponds to the chosen topic, not all the content points are covered it is not clearly divided into introduction, main body and conclusion; presentation is free from logical fallacies; presentation does not contain appropriate references in APA style in speech and slides;

0 points – the student does not adequately address any part of the task: the presentation is not divided into introduction, main body and conclusion and the parts of the presentation are not connected with linking devices; presentation does not contain appropriate references in APA style in speech and slides.

Language Use (max 3 points):

3 points – the speaker uses an appropriate amount of academic vocabulary, terminology is relevant to the subject, synonyms are used to avoid repetitions, the hedging strategies are applied when applicable, the speaker uses collocations and advanced grammar when needed, pronunciation and speech flow are natural, occasional vocabulary and grammar mistakes in speech causing no difficulties for the audience; texts on slides have no vocabulary and grammar mistakes; the speaker naturally fills in the pauses caused by breakdowns of different nature;

2 points – the speaker complies with academic register, the speech is characterized by fluency and adequate pace; the speaker does not use collocations, omits vocabulary and grammar mistakes that sometimes cause difficulties for the audience, and/or there are 1-2 vocabulary and/or grammar mistakes on slides; the speaker naturally fills in the pauses caused by breakdowns of different nature;

1 point – the speaker demonstrates limited language resource; the vocabulary and grammar are generally appropriate with a few non-impeding inaccuracies; the speaker fills in the pauses caused by breakdowns of different nature with effort;

0 points – the speaker demonstrates poor language resources, omits vocabulary and grammar mistakes that cause serious difficulties for the audience, and the speaker does not fill in the pauses.

Manner of Delivery (max 2 points):
2 points – the presenter speaks with confidence maintaining a certain level of dynamics and keeping an appropriate posture and body language, maintains the adequate level of eye contact, uses stress, intonation and pausing appropriately; the presentation is given without reading off the slides or paper within the given time limit; the presenter makes 1-2 pronunciation mistakes in words of common use causing no difficulties for the audience, when answering questions; the speaker interacts with ease and responds appropriately;
1 point – the presenter makes 3-4 pronunciation mistakes causing difficulties for the audience and/or the presenter uses stress, intonation and pausing with limited control causing some difficulties for the audience; the presentation is given without reading off the slides or paper, when answering questions; the speaker interacts with effort or responds inappropriately; the speaker delivers the content within the given time limit;
0 points – the presenter makes 5 and more pronunciation mistakes in words of common use causing difficulties for the audience; the speaker does not interact with the audience; the presentation is given with reading off the slides or paper; the presentation does not fit the time limit.

Visual Aids (max 2 points):
2 points – the visuals are prepared in a certain style consistent throughout the presentation and well readable (font, color); each visual has a heading relevant to the overall theme of the presentation, conforming to the academic register; each visual contains only key words and phrases without complete sentences; presentation as a whole has an adequate balance of graphic and verbal information;
1 point – the visuals are well readable (font, color), contain both complete sentences and key words and phrases, presentation has a disbalance of graphic and verbal information;
0 points – the visuals are not well readable, and do not conform to the academic register.

DISCUSSION IN A Q& A SESSION FORMAT ASSESSMENT CRITERIA
(max. 10 points)

Task Response (max 3 points)
3 points – the student fully addresses all parts of the task: the student presents a fully developed position in answer to the question with relevant, fully extended and well supported ideas; content corresponds to the topic of the discussion;
2 points – the student addresses all parts of the task although some parts may be more fully covered than others: the student presents a relevant position although the conclusions may be unclear or repetitive; content corresponds to the topic of the discussion;
1 point – the student responds to the task only in a minimal way or the answer is tangential: presents some ideas but they may be repetitive, irrelevant or not well supported (attitude is not expressed, and/or the arguments are not fully developed or extended); content is partially relevant to the topic;

0 points – the student does not adequately address any part of the task; the student does not express a clear position; the student presents few ideas, which are largely undeveloped or irrelevant.

Coherence and Cohesion (max 2 points)

2 points – the student applies logic when organising ideas, effectively uses a wide range of cohesive devices, introductory constructions, makes the points clearly but briefly;

1 point – the student applies logic when organising ideas, but there might be an occasional breach in logic, cohesive devices are inadequate, repetitive, under- or overused;

0 points – the student does not apply logic when organising ideas, there are no linking devices, introductory constructions and/or they are used inappropriately.

Lexical Resource and Register (max 2 points)

2 points – the student uses a wide range of appropriate vocabulary attempting to use some advanced lexical items, phrases useful for the discussion development;

1 point – the student uses appropriate but limited vocabulary; phrasal verbs and/or collocations are used inappropriately;

0 points – the student's vocabulary is too limited to comment on the topic, numerous mistakes impede understanding, active vocabulary is not used or used inappropriately.

Grammatical Range and Accuracy (max 2 points)

2 points – the student uses a wide range of grammar structures;

1 point – the student uses basic grammar structures and may make occasional mistakes which do not impede communication;

0 points – the student makes numerous grammar mistakes which impede communication.

Fluency, pronunciation (max 1 point)

1 point – the student's speech is smooth and fluent; there might be some minor pronunciation mistakes but they don't impede communication; intonation is appropriate; all sounds are articulated clearly;

0 points – the speech is slow; it takes the student time to find words; he/she fumbles the words and ideas and/or makes numerous pronunciation mistakes which impede communication; intonation is not appropriate; some sounds are articulated indistinctly.

A GROUP CASE INTERVIEW CRITERIA (max. 10 points)

	3	2	1	0
Task Response	The student addresses all three points in detail: the student fully	The student addresses all three points: the student misunderstands	The student addresses two points: the student misunderstands	The student addresses less than two points: the student misunderstands

	understands the questions asked and answers correctly; the student asks appropriate questions that are relevant; the contributions are relevant to the task. The student maintains communication throughout the whole discussion.	1-2 questions asked and gives 1-2 incorrect answers; the student asks 1-2 irrelevant questions; the student makes 1-2 contributions that are irrelevant to the task. **OR** The student addresses two points in detail: the student fully understands the questions asked and answers correctly; the student asks appropriate questions that are relevant; the contributions are relevant to the task. The student mostly maintains communication throughout the whole discussion.	3-4 questions asked and gives 3-4 incorrect answers; the student asks 3-4 irrelevant questions; the student makes 3-4 contributions that are irrelevant to the task. **OR** The student addresses one point in detail: the student fully understands the questions asked and answers correctly; the student asks appropriate questions that are relevant; the contributions are relevant to the task. One of the students participates in the discussion more actively than the other one.	5 and more questions asked and gives more than 5 incorrect answers; the student asks 5 and more irrelevant questions; the student makes 5 contributions that are irrelevant to the task. The conversation is mostly one-way.*
Coherence and Cohesion		The ideas are logically connected.	The ideas are not always logically connected.	The ideas are not logically connected.

		AND The student properly uses at least 4 appropriate linking devices and discourse markers. **AND** The student links their contributions to those of other speakers. **AND** The student uses initiating and responding techniques and strategies effectively.	**AND/OR** The student properly uses 2-3 appropriate linking devices and attempts to use discourse markers. **AND/OR** The student attempts to use initiating and responding techniques and strategies.	**AND/OR** The student properly uses fewer than 2 linking devices and discourse markers. **AND/OR** The student does not use initiating and responding techniques and strategies.
Lexical resource and register		The student **effectively** uses at least 5-6 subject specific vocabulary units. **AND** The student **may make** no more than 2 minor vocabulary mistakes that do not impede	The student **effectively uses** 3-4 subject specific vocabulary units. **AND/OR** The student **may make** 3-4 minor vocabulary mistakes that do not impede communication	The student **effectively uses** fewer than 3 subject specific vocabulary units. **AND/OR** The student makes 5 and more *minor vocabulary mistakes* that do not impede communication

		communication (word formation, collocation). **AND** The student **uses formal style** (1-2 occasional uses of *informal vocabulary**** are allowed)	(word formation, collocation). **AND/OR** The student **may make** 1-2 vocabulary mistakes that impede communication (word formation, collocation). **AND/OR** The student uses formal style (3-4 uses of *informal vocabulary* are allowed **AND/OR** 1-2 uses of *slang/informal contractions***** are allowed).	(word formation, collocation). **AND/OR** The student makes 3 and more *vocabulary mistakes* that impede communication (word formation, collocation). **AND/OR** The student fails to use formal style (more than 4 uses of *informal vocabulary* **AND/OR** more than 2 uses of *slang/informal contractions).*
Grammatical range and accuracy		The student **effectively uses** at least 4 *subject specific grammatical structures******). **AND** The student **may make** 2-3 minor grammar	The student **effectively uses** at least 2 *subject specific grammatical structures).* **AND/OR** The student **may make** 4-6 minor grammar mistakes that do	The student uses fewer than 2 *subject specific grammatical structures*). **AND/OR** The student makes more than 6 minor grammar mistakes that do

		mistakes that do not impede communication.	not impede communication. **AND/OR** The student **may make** 1-2 grammar mistakes that impede communication.	not impede communication. **AND/OR** The student makes more than 2 grammar mistakes that impede communication.
Performance			The student speaks fluently with only rare repetition or self- correction (no more than 2-3). Any hesitation is content- related/ justified by the context rather than to find words or grammar. The student uses natural intonation patterns.	The student speaks with repetition or self- correction (more than 3). **AND/OR** Hesitation is related to finding words or grammar. **AND/OR** The student uses unnatural intonation patterns / monotonous intonation.

The discussion resembles a monologue. If the student is the one mostly talking, they receive 0 for Task Response only. If the student is the one not participating, they receive 0 for the whole case interview

**Effectively used vocabulary includes correct pronunciation and relevant use in context*

***Informal vocabulary does not include slang*

****Informal contractions include "wanna", "gonna", "gotta", "shoulda", "woulda", etc. and DO NOT include "I'm", "don't", etc.*

*****Subject specific grammatical structures include: modals / hedging; passive voice; reporting using passive; nominalisation; relative clause; articles (specifics….)*

- **Independent work Assessment**

1. Independent work = (grade for home assignments + grade for vocabulary and grammar tests)

2. Independent work is graded based on a 10-point grading scale.

Grade	10	9	8	7	6	5	4	3	2	1	0
% fully completed tasks at home/in the classroom/online work	100 - 96%	95 - 91%	90 - 86%	85 - 78%	77 - 71%	70 - 61%	60 - 51%	50 - 36%	35 - 21%	20 - 1 %	0%

Commentary:
Independent work includes home assignments and tests.
Home assignments are assessed as follows:
1 point – the student has submitted all the home assignments before the deadline.
0 points - not all the tasks have been submitted or the student has missed the deadline.
The sum of all points students have received is converted into the 10-point grading scale proportionally.
Vocabulary and grammar tests are conducted in the test simulator in Smart LMS.
Students have three attempts to complete the test, and the best test result is considered to be his/her score for the test.
Each vocabulary and grammar test contains 20 vocabulary and 20 grammar questions.
The test must be completed in 30 minutes.
For each correct answer the student gets 0.25 points, and the maximum for a test is 10 points.
The final score for vocabulary and grammar tests is the mean of seven tests.

The elements of independent work cannot be retaken.

- **Final Assessment**

Period of Final Assessment: the final exam is held in class within 10 days before the exam period online on MS Teams platform.
The release of examination papers: during the session.
The exam consists of one written assignment - a video-lecture review.
0 points in case of cheating.
Retaking exams: The final test can be retaken till the 15th of October 2022 if a student missed it for a valid reason. The absence must be documented (e.g. doctor's confirmation).
Time limit: 50 minutes online/offline.

<div align="center">**REVIEW ASSESSMENT CRITERIA (max 10 points)**</div>

Recommended word count – 250-300

<u>Task Response (max 3 points)</u>

3 points – the student fully addresses all parts of the task (writes a title and a catchy introduction which identifies the reviewed item, gives a complete and fair description of the item, makes valid recommendations in conclusion); presents a fully developed position in answer to the question with relevant, fully extended and well supported ideas (presents a thorough discussion);

2 points – the student addresses all parts of the task although some parts may be more fully covered than others (writes a title and a relevant introduction, gives a narrow description, makes valid recommendations in conclusion); presents a relevant position although the conclusions may be unclear or repetitive; presents relevant main ideas but some may be inadequately developed/unclear;

1 point – the student responds to the task only in a minimal way or the answer is tangential; the format may be inappropriate: the student does not write a title but writes an introduction, gives a short description of the item, makes invalid recommendations in conclusion; the student presents a position but it is unclear; presents some main ideas but they are difficult to identify and may be repetitive, irrelevant or not well supported;

0 points – the student does not adequately address any part of the task: the student does not write an introduction, presents undetailed arguments, neither presents the personal impression nor the verdict; does not express a clear position; presents few ideas which are largely undeveloped or irrelevant.

<u>Coherence and Cohesion (max 2 points)</u>

2 points – the student writes a clearly structured objective review on the item, uses a variety of linking devices which connect the ideas appropriately, organises information in a logical order, uses paragraphing sufficiently;

1 point – the student writes a poorly structured review, uses a limited number of linking devices, does not use paragraphing sufficiently;

0 points – the student does not organise information and ideas logically, fails to use linking devices appropriately or repeats them.

<u>Lexical Resource and Register (max 2 points)</u>

2 points – the student uses a wide range of vocabulary specific to this topic without repetitions, makes 1 lexical or spelling mistake, the review is written in the appropriate register;

1 point – the student uses a limited range of vocabulary, fails to use active vocabulary items, makes 2 lexical or spelling mistakes, the student uses the appropriate register;

0 points – the student uses basic vocabulary, makes 3 or more lexical / spelling mistakes, the student uses an inappropriate register.

<u>Grammatical Range and Accuracy (max 2 points)</u>

2 points – the student uses a variety of complex grammar structures and makes 1 grammar mistake;

1 point – the student uses basic grammar structures and makes 2 grammar mistakes;

0 points – the student makes numerous grammar mistakes which impede understanding.

Punctuation (max 1 point)

1 point – the students may make 1-2 punctuation errors;

0 points – the students makes more than 2 punctuation errors.

Interim assessment

0.250   Written assessment

0.200   Oral assessment

0.250   Independent work assessment

0.300   Final assessment

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Sources

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Recommended Core Bibliography

Мельничук, М.В. Английский язык: математика для экономистов + еПриложение: тесты : учебник / Мельничук М.В., Восковская А.С., Карпова Т.А. — Москва : КноРус, 2021. — 214 с. — ISBN 978-5-406-02661-8. — URL: https://book.ru/book/936550 (дата обращения: 22.05.2021). — Текст : электронный.

Назарова, Н. А. Профессиональный английский: математика и физика = Professional English in Use: Mathematics and Physics : учебное пособие / Н. А. Назарова, Е. В. Панасенко, О. М. Толстых. — Омск : ОмГПУ, 2018. — 124 с. — ISBN 978-5-8268-2184-8. — Текст : электронный // Лань : электронно-библиотечная система. — URL: https://e.lanbook.com/book/170540

Кохан, О. В. Английский язык для технических направлений : учебное пособие для вузов / О. В. Кохан. — 2-е изд., испр. и доп. — Москва : Издательство Юрайт, 2021. — 226 с. — (Высшее образование). — ISBN 978-5-534-07777-3. — Текст : электронный // ЭБС Юрайт [сайт]. — URL: https://urait-ru.proxylibrary.hse.ru/bcode/470836

Recommended Additional Bibliography:

Стогниева, О. Н. Английский язык для ИТ-направлений. English for Information Technology : учебное пособие для вузов / О. Н. Стогниева. — Москва : Издательство Юрайт, 2021. — 143 с. — (Высшее образование). — ISBN 978-5-534-07849-7. — Текст : электронный // ЭБС Юрайт [сайт]. — URL: https://urait.ru/bcode/472846

Коваленко, И. Ю. Английский язык для физиков и инженеров : учебник и практикум для вузов / И. Ю. Коваленко. — Москва : Издательство Юрайт, 2021. — 278 с. — (Высшее образование). — ISBN 978-5-9916-8624-2. — Текст : электронный // ЭБС Юрайт [сайт]. — URL: https://urait.ru/bcode/469246

Equipment of the classroom:

- a set of demonstration equipment: personal computer / laptop, a multimedia projector with audio/video, a projection screen, an interactive whiteboard, a video panel, and other means of demonstrating educational content. It is allowed to use a portable set of demonstration equipment for conducting classes.
- availability of wireless Internet access via Wi-Fi network.

Online platforms for distance learning / communication:
- Smart LMS;
- Microsoft Teams.

Corporate access is available to the instructors and students when using HSE corporate e-mail addresses.

Organization of Studies for Persons with Limited Mobility and Disabilities

If necessary, learners with limited mobility or a disability (as per his/her application), as well as per his/her individual rehabilitation programme, may be offered the following options for receiving learning information with due consideration of his/her individual psycho-physical needs (e.g., via eLearning studies or distance technologies):

- *for persons with impaired vision*: enhanced fonts in hard copy documents; e-documents; audio files (transfer of study materials to an audio-format); hard copy documents with the use of Braille; individual consultation with a facilitated communicator; individual assignments and mentoring;
-*for persons with hearing impairments*: in hard copy; e-documents; video materials with subtitles; individual consultation with a facilitated communicator; individual assignments and mentoring;
- *for persons with a muscular-skeleton disorder*: in hard copy; e-documents; audio-files, individual assignments and mentoring.

Sample tasks

Brief card

You are participating in a group case interview. With a partner, do the following:

- get to know each other
- find out about each other's previous projects / experience
- discuss the case below and come to a solution

You have 5-7 minutes for the interview.

Case:

Your company wants to upgrade their equipment. You spend a third of all the money you have on new computers. Half of your remaining money you use to buy computer keyboards. A quarter of the rest of your money you use to buy computer mice. What proportion of your original money is remaining? What other equipment would you buy with the rest of the money and why?

Motivation letter

Task.

You are applying for a semester-long student exchange program to study Applied Maths at another university. Write a motivation letter to the Admissions Committee. Say why you would like to participate in the program and which of your achievements and experiences can make you a suitable candidate.

Presentation

You are going to make a presentation on a specific topic. You should introduce the topic, give 1-2 main details and give a conclusion.

After the presentation, take questions from the audience and respond giving more details into your topic.

When watching other presentations, you should ask 2-3 follow-up questions.

OR

You are going to make a presentation on the current project you are involved in. You should introduce the main idea, provide 1-2 examples of its application and describe the current status of the project.

After the presentation, take questions from the audience and respond giving more details into your topic.

When watching other presentations, you should ask 2-3 follow-up questions.

Pronunciation test

Pronounce the following phrases:

1. programming procedure
2. accessible data
3. crescent circuit
4. objective colleagues
5. correct height
6. analysis of the architecture

7. the author of the thesis
8. accurate experiment
9. characteristic feature
10. advantageous component

Review (article)
Read the article below and write a review (300-350 words).

Engineers harvest WiFi signals to power small electronics

With the rise of the digital age, the amount of WiFi sources to transmit information wirelessly between devices has grown exponentially. This results in the widespread use of the 2.4GHz radio frequency that WiFi uses, with excess signals available to be tapped for alternative uses.

To harness this under-utilised source of energy, a research team from the National University of Singapore (NUS) and Japan's Tohoku University (TU) has developed a technology that uses tiny smart devices known as spin-torque oscillators (STOs) to harvest and convert wireless radio frequencies into energy to power small electronics. In their study, the researchers had successfully harvested energy using WiFi-band signals to power a light-emitting diode (LED) wirelessly, and without using any battery.

The research was carried out in collaboration with the research team of Professor Guo Yong Xin, who is also from the NUS Department of Electrical and Computer Engineering, as well as Professor Shunsuke Fukami and his team from TU. The results were published in *Nature Communications* on 18 May 2021.

Converting WiFi signals into usable energy

Spin-torque oscillators are a class of emerging devices that generate microwaves, and have applications in wireless communication systems. However, the application of STOs is hindered due to a low output power and broad linewidth.

While mutual synchronisation of multiple STOs is a way to overcome this problem, current schemes, such as short-range magnetic coupling between multiple STOs, have spatial restrictions. On the other hand, long-range electrical synchronisation using vortex oscillators is limited in frequency responses of only a few hundred MHz. It also requires dedicated current sources for the individual STOs, which can complicate the overall on-chip implementation.

To overcome the spatial and low frequency limitations, the research team came up with an array in which eight STOs are connected in series. Using this array, the 2.4 GHz electromagnetic radio waves that WiFi uses was converted into a direct voltage signal, which was then transmitted to a capacitor to light up a 1.6-volt LED. When the capacitor was charged

for five seconds, it was able to light up the same LED for one minute after the wireless power was switched off.

In their study, the researchers also highlighted the importance of electrical topology for designing on-chip STO systems, and compared the series design with the parallel one. They found that the parallel configuration is more useful for wireless transmission due to better time-domain stability, spectral noise behaviour, and control over impedance mismatch. On the other hand, series connections have an advantage for energy harvesting due to the additive effect of the diode-voltage from STOs.

Commenting on the significance of their results, Dr Raghav Sharma, the first author of the paper, shared, "Aside from coming up with an STO array for wireless transmission and energy harvesting, our work also demonstrated control over the synchronising state of coupled STOs using injection locking from an external radio-frequency source. These results are important for prospective applications of synchronised STOs, such as fast-speed neuromorphic computing."

Review (lecture)
Watch the video and write its review (300-350 words).
The video: https://www.youtube.com/watch?v=_Idra8rVS1I

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Grammar and vocabulary test

Grammar

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Complete the paragraph using the right articles.

1) _____time-series graphs are popular with (2)_____ newspapers for suggesting and comparing (3) _____ trends. However, showing how a single quantity varies with (4)_____ time is not the same as showing how two quantities vary, and then suggesting a link between them. (5) _____ graphs showing the variation of two things with (6)_____ time often use two different vertical scales. Figure 34 shows an example taken from a national newspaper.

This graph was included in a front-page article suggesting that there is a link between (7)_____ level of unemployment among (8) _____ young men and (9)_____ number of offenders committing (10)_____ burglaries. (11) _____ way the graph has been drawn seems unambiguously to support (12) _____ claim that when (13) _____ unemployment rises so does (14)_____ crime and, by virtue of (15)_____ closeness of (16) _____ shape of (17) _____ two curves, carries (18) _____ strong implication that indeed (19) _____ unemployment causes (20) _____ crime.

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Vocabulary

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Fill in the gaps using active vocabulary.

1. The process of finding a _____ is called differentiation.
2. The _____ of a line can also be interpreted as the "average rate of change."
3. Alternating the signs of the reciprocals of positive integers produces a _____ series.
4. A _____ that does not converge is divergent.
5. The _____ form the smallest group and the smallest ring containing the natural numbers.
6. The _____ is the range of the function.
7. If at each point of an interval f has a derivative that does not change sign (respectively, is of constant sign), then f is _____ on this interval.
8. A _____ is the value that a function (or sequence) approaches as the input (or index) approaches some value.
9. The curve of the _____ is a periodic curve with period T=π and asymptotes x=(k+1/2)π, k∈**Z.**
10. _____ is defined as a numerical value equal to the area under the graph of a function for some interval or a new function the derivative of which is the original function.