

The syllabus of the discipline
Billing systems in information communication networks

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Field name	Detailed content, comments
Name of the faculty	Faculty of Infocommunications
Level of higher education	First (bachelor's)
Code and name of the specialty	172 Telecommunications and radio engineering
Type and name of educational program	EPP "Information and Network Engineering"
Name of the discipline	Billing systems in information communication networks
Number of ECTS credits	3
Discipline structure (distribution by types and hours of study)	20 hours - 10 lectures, 16 hours - 4 laboratory classes, 6 hours - 3 consultations, 48 hours - homework, type of control: credit
Schedule (terms) of studying the discipline	4th year, VII semester
Prerequisites for studying the discipline	Basic knowledge of disciplines: mobile networks communication systems, mobile communication systems.
Competences, knowledge, skills, understanding, which is acquired by the applicant in higher education in the learning process	The discipline is used for formation of the following competencies: use the theoretical provisions of design and operation of billing systems.
The quality of the educational process	Educational-methodical and material-technical resource provision of the educational program, within the framework of which the discipline is studied, meets the licensing requirements and accreditation conditions of the educational activity of the university. Annual monitoring and revision of the curriculum of the discipline in accordance with the requirements and recommendations of the Ministry of Education and Science, state certification of acquired competencies of graduates, standards of cooperation with employers to ensure a competitive level of training. Adherence to the principles of academic integrity (https://lib.nure.ua/plagiat). Contains public information on the requirements, competencies, level of education within the current educational program.

Description and content of the discipline

The purpose of studying the discipline - is to provide students with knowledge, skills and abilities in the design and operation of billing systems.

Content

Content module 1. Basic concepts and elements of billing systems.

Topic 1. Basic concepts and terminology in billing systems.

Topic 2. Structure and functions of billing systems in INE.

Topic 3. Regulatory framework for the operation of communications companies.

Content module 2. Calculations for the provision of communication services in Ukraine.

Topic 1. Payments for communication services.

Topic 2. Profits of telecom operators. Tariffs for communication services.

Topic 3. Tools and technologies for payment for services. Universal billing.

Topic 4. Rules for providing and receiving communication services in Ukraine.

Topic 5. Functionality of communication services charging programs.

Topic 6. OSS (Operational Support Systems).

Content module 3. Development and operation of billing systems in information communication networks.

Topic 1. Development of a convergent billing system.

Topic 2. Modeling of the billing system based on business process approach.

Topic 3. Hot billing.

Topic 4. Billing and management systems for IP-telephony users.

Topic 5. Billing systems for Internet services.

Topic 6. Criteria for choosing billing systems.

Topic 7. Directions of development of billing systems in accordance with the requirements of IETF and 3G

Learning outcomes of higher education

As a result of studying the discipline, students must:

know: the basic principles of operation and construction of billing systems, their capabilities and limitations.

be able to: use theoretical positions in the design and operation of billing systems.

Assessment system according to each task for passing the test / exam

To assess the work of a student during the semester, the final rating score Q_{sem} is calculated as the sum of marks for different types of classes and control activities.

Type of lesson / control measure	Rating
Lb № 1, 2	2x15=30
Control testing 1	10
Checkpoint 1	40
Lb № 3,4	2x15=30
Control testing 2	10
IHW (abstract)	20
Checkpoint 2	60
Total for the semester	100

As a form of final control for the discipline is used test. To get a test you need to know the main topics of the discipline, work out and defend all laboratory work, write tests, prepare and defend an abstract.

Qualitative evaluation criteria in the national scale and ECTS

Satisfactory, D, E (60-74). Show the required minimum of theoretical knowledge. Know the ways and methods of solving practical problems and be able to use them in practice.

Well, C (75-89). Firmly know a minimum of theoretical knowledge. Demonstrate the ability to solve a practical problem and justify all stages of the proposed solution.

Excellent, A, B (90-100). Show complete knowledge of basic and additional theoretical material. Unmistakably solve a practical problem, explain and justify the chosen method of solution.

Assessment scale: national and ECTS

The sum of points for all types of educational activities	ECTS assessment	Score on a national scale	
		for exam, course project (work), practice	for offset
90 – 100	A	perfectly	credited
82-89	B	fine	
74-81	C		
64-73	D	satisfactorily	
60-63	E		
35-59	FX	unsatisfactory with the possibility of reassembly	not credited with the possibility of re-assembly
0-34	F	unsatisfactory with mandatory re-examination	not credited with compulsory re-study of the discipline

Methodical support

Basic literature

1. Bezruk V.M. Informatsiini merezhi zviazku. Ch. 4. Tekhnolohii nadannia informatsiinykh posluh: navch. posibnyk / V.M. Bezruk, V.M. Korolov, V.A. Zolotarov ta inshi. – Kharkiv: KhNURE, 2011. – 424 s.
2. Dych L.Z. Byllynhovye systemy v telekommunikatsiyakh / L.Z. Dych. – M.: Radyo y sviaz, 2003. – 232 s.
3. Mussel K.M. Predostavlenye y byllynh usluh sviazy. Systemnaia yntehratsyia / K.M. Mussel. – M.: Eko-Trendz, 2003. – 320 s.
4. Hunter M. Jane. Thiebaud Telecommunications billing systems: implementing and upgrading for profitability. / M. Jane Hunter, E. Maud. – N.-Y.: McGraw-Hill Professional, 2003.

Supporting literature

1. Pistunov, I.M. Informatsiini systemy v finansovo-kredytnykh ustanovakh: navch. posib./ I.M. Pistunov, T.V. Borshch. – K. : TsUL, 2013. – 234 s.
2. Maksymenko V. N. Zashchyta ynformatsyy v setiakh sotovoi podvyzhnoi sviazy / V.N. Maksymenko, V.V. Afanasev, N.V. Volkov; red. O.B. Makarevych – M.: Horiachaia lynyia - Telekom, 2007. – 360 s.
3. Holubytskaia E.A. Ekonomyka sviazy: Uchebnyk dlia studentov vuzov sviazy./ E.A. Holubytskaia, H.M. Zhyhul'skaia. – M.: Radyo y sviaz, 2000. – 391s.
4. Ekonomyka sviazy / Pod red. O.S. Srapyonova, V.N. Boldyna. – M.: Radyo y sviaz, 1998. – 304s.
5. Osnovy ekonomyky telekommunikatsyi (sviazy): Uchebnyk dlia vuzov / M.A. Horelyk, E.A. Holubytskaia, T.A. Kuzovkova y dr.; pod red. M.A. Horelyk y E.A. Holubyskoi. – M.: Radyo y sviaz, 1997. – 224s.
6. Operatorska platforma nadannia posluh: Elektronne navchalne vydannia. Konspekt lektsii / L. S. Hloba, O.M. Diadenko, V.F. Cherdyntseva. – K.: NN ITS NTUU «KPI», 2012. – 191 s.

Methodical instructions for different types of classes

1. Konspekt lektsii z dystsypliny «Bilinhovi systemy v informatsiinykh merezhakh zviazku» dlia studentiv usikh form navchannia spetsialnosti 172 «Telekomunikatsii ta radiotekhnika» spetsializatsii «Telekomunikatsii», «Informatsiino-merezhna inzheneriia» [Elektronnyi dokument] / Uporiad. D.V. Chebotarova. – Kharkiv: KhNURE, 2017. - 52 s.
2. Metodychni vказivky do samostiinoi roboty z dystsypliny «Bilinhovi systemy v informatsiinykh merezhakh zviazku» dlia studentiv usikh form navchannia spetsialnosti 172 «Telekomunikatsii ta radiotekhnika» spetsializatsii «Telekomunikatsii», «Informatsiino-merezhna inzheneriia» [Elektronnyi dokument] / Uporiad.: D.V.Chebotarova. - Kharkiv: KhNURE, 2017.
3. Metodychni vказivky do vykonannia laboratornykh robit iz dystsypliny «Bilinhovi systemy v informatsiinykh merezhakh zviazku» dlia studentiv spetsialnosti 172 «Telekomunikatsii ta radiotekhnika» spetsializatsii «Telekomunikatsii», «Informatsiino-merezhna inzheneriia» [Elektronnyi dokument] / Uporiad.: D.V. Chebotarova. – Kharkiv: KhNURE, 2017. – 60 s.

Information support

1. Paket prohram DialExpert.
2. Paket prohram Ramus-educational.