

NATIONAL UNIVERSITY  
OF LIFE AND ENVIRONMENTAL SCIENCES OF UKRAINE

Department of Statistics and Economic Analysis

**“APPROVED”**

Dean of Agrarian Management Faculty,

\_\_\_\_\_ A.D. Ostapchuk

" \_\_\_\_\_ " \_\_\_\_\_ 2021 y.

**“ENDORSED”**

on the department meeting \_\_\_\_\_

Record №\_15\_ dated on “20”\_05\_2021

Head of the department Lazaryshyna I.D.

**”REWIEVED ”**

Guarantor \_\_\_\_\_ Zbarskyi V.K.

Guarantor EP

**WORKING PROGRAM OF EDUCATIONAL  
DISCIPLINE**

**“Econometrics”**

*Specialty* 075 “Marketing”

*Educational program* “Marketing”

*Faculty of Economic*

*Developer* Olena Bohdaniuk, Associate Professor of the Department of  
Statistics and Economic Analysis, PhD in Economics, Associate Professor

**1. Description of the discipline  
ECONOMETRICS**

| <b>Field of knowledge, specialty, educational program, educational degree</b> |                     |                    |
|---|---------------------|--------------------|
| Educational degree  | Bachelor            |                    |
| Specialty   | 075 "Marketing"     |                    |
| Educational program   | "Marketing"         |                    |
| <b>Characterization of discipline</b>   |                     |                    |
| Type  | Mandatory           |                    |
| Total number of hours   | ___ 90 ___          |                    |
| Number of ECTS credits  | ___ 3 ___           |                    |
| The number of structural modules  | ___ 2 ___           |                    |
| Course project (work)<br>(if your curriculum)                                 | _____ (name)        |                    |
| Form of control   | Exam Test           |                    |
| <b>Indicators of discipline for full-time and distance learning</b>           |                     |                    |
|   | full-time education | distance education |
| Year of training  | ___ 2 ___           |                    |
| Semester  | ___ 4 ___           |                    |
| Lectures  | ___ 15 ___ hours    |                    |
| Practical, seminars   | ___ 30 ___ hours    |                    |
| Laboratory studies  | _____ hours         |                    |
| Independent work  | 60 hours            |                    |
| Individual tasks  | _____ hours         |                    |
| The number of weekly hours<br>for full-time study:<br>classroom               | ___ 3 ___ hours     |                    |

## **2. Purpose, tasks and competencies of the discipline**

**The purpose of econometrics** is acquisition by the future specialists knowledge of the methods of construction of economically-mathematical models on macro and micro levels, abilities to utilize the proper mathematical vehicle in the decision of economic and administrative tasks and development of creative and analytical skills for economists and managers from a mathematical modeling, including usage of the personal computer for conducting of researches.

### **Forms of control of student's knowledge's:**

Criteria of estimation of student's knowledge. For objective determination of quality of knowledge of students the module-rating system of evaluation of knowledge is utilised. The evaluation system is given more flexible and more objective than previous, that is instrumental in systematic and active independent work of students during all of period of studies, provides a healthy competition between students in studies, instrumental in an exposure and development of capabilities of students. Current control of knowledge of students and mastering by them programmatic material a teacher which conducts employment from a course carries out. He is carried out in the process of conducting of practical and individual employments. During practical employments such controls are used: verbal questioning from themes, certain plans practical employments, conducting of test control, by the evaluation of implementation of individual calculation tasks on the proper subject. Final control is carried out as examination (to the test) at the end of semester. At establishment of estimation effectiveness of current control, mastering of educational material is taken into account. The evaluation of results of capture of educational material a student takes a place taking into account the shown knowledge and carried out it is differentiated in accordance with the accepted Statute about the credit-module system of studies.

**The result of studying the discipline is the acquisition by students of such competencies**

*1. Special (professional) competence:*

- Интерп - Ability to solve complex specialized problems and practical problems characterized by complexity and uncertainty of conditions, in the field of management or in the process training involving the use of theories and methods social and behavioral sciences.

- CK2 Ability to analyze the results of the organization, compare them with external and internal factors environment.

-CK12 Ability to analyze and structure problems organizations, to form reasonable decisions.

**3. The Program of educational discipline**

**The structure of the discipline  
Econometrics**

| The names of the modules and themes  |
|--|
| <b>Modul 1</b><br><b><i><u>Methods of construction of general linear model</u></i></b>                           |
| Theme 1. Subject, methods and objectives of discipline   |
| Theme 2. Methods of the general linear model   |
| Theme 3. Multicollinearity and its impact on the estimation of the model parameters                              |
| Theme 4. Generalized least squares   |
| Theme 5. Econometric model of the dynamics   |
| <b>Modul 2</b><br><b><i><u>Empirical methods of quantitative analysis based on statistical equations</u></i></b> |
| Theme 6. Empirical methods of quantitative analysis based on statistical equations                               |
| Theme 7. Construction an econometric model with the autocollinearity remains                                     |
| Theme 8. Methods of instrumental variables   |
| Theme 9. Distributed lag models  |

### ***Theme 1. Subject, methods and objectives of discipline***

Nature of econometrics. The role of econometric studies in economics. Object, subject, goals, tasks and structure of the course. Place and course importance among basic disciplines for preparation Bachelor in Economics. Relationship of course to related disciplines. The history of occurrence and the course "Econometrics" in the leading educational institutions in the world. Examples of the application of econometric methods for solving economic problems. The main characteristics of the economic system as the object of modeling. The concept of model. The mathematical model, the main stages of the modeling process. Classification of economic-mathematical models. Contemporary methodological foundations of econometric modelling, a priori and a posteriori role of information. The statistical basis of econometric models. Variable and equations in econometric models, macro- and microeconomic data set and the base, their relationship to aggregation. The main types of econometric models and their relationship to other types of mathematical models. Stages of econometric analysis of economic processes and phenomena's.

### ***Theme 2. Methods of the general linear model***

General view of a linear econometric model, its structure and stages of construction. Specification. Prerequisites for using the method of least squares (OLS 1). Properties of estimates, their characteristics.

Correctness of constructing econometric model and test the significance of parameter estimates and the model itself. Statistical criterias for the assessment of significance. Standard errors and reliability of the forecast. Confidence intervals function of regressions.

Standardized linear econometric model. The economic interpretation of the estimates of the model parameters. Their use in the econometric analysis.

Construction models based on stepwise regression. Simple econometric models. Construction the linear and linear-logarithm production functions. Econometric analysis of production functions, the interpretation of results.

### ***Theme 3. Multicollinearity and its impact on the estimation of the model parameters***

The concept of the main principles of the classical correlation econometric analysis. The concept of multicollinearity, methods and characteristics of its identification. Functional and stochastic collinearity. Measurement of multicollinearity. Algorithm of the Farrar-Hlober. Ways to eliminate multicollinearity: exclusion from the analysis the factor, linear transformation of variables, exceptions trend, turn-based correlation and regression, factorial approach and the method of main components.

### ***Theme 4. Generalized least squares***

The concept of heteroscedasticity and methods of its study. The impact of heteroscedasticity on the properties of parameter estimates.

Generalized least squares method (Aitken method) estimates of the parameters of the linear econometric models with heteroscedastic residues. Formation the matrix  $S$ . The definition of operator estimates and corresponding covariance matrix. Checking the significance and construction of confidence intervals for the model parameters. Numerical example of the implementation the method of Aitken. Construction the prognosis.

### ***Theme 5. Econometric model of the dynamics***

Features of the econometric modelling based on time series. Trend model and methods to determine its parameters. The shape of the trend (linear, parabolic, hyperbolic, logical). Interpretation the parameters of the trend model. Graphic representation of the trend. Evaluation of the trend stability. Coefficient of the trend stability. Justification projected estimates of economic phenomena's.

### ***Theme 6. Empirical methods of quantitative analysis based on statistical equations***

The advisability of the use in econometric calculations the statistical equations dependencies. The method of regression analysis and the method of statistical dependence equations. Comparison coefficients is the base of statistical equations dependencies. Calculation parameters of equations dependencies for: simple and curved connection; multiple linear and curvilinear relation. Calculation parameters dependence (one-factor and multifactor), correlation coefficient and index. Forecast calculations.

Sense of equations parameters by different dependencies. Calculation of stability coefficient for evaluation the reliability of the equations of dependencies parameters. Determination the proportion of influence factors on the resultant variable. Plotting one-factor and multiple dependencies. Justification projected estimations of economic phenomena's.

#### ***Theme 7. Construction an econometric model with the autocollinearity remains***

The concept of autocorrelation. The nature and consequences of autocorrelation in econometric models. Check for autocorrelation. Durbin-Watson criterion.

Estimation of model parameters with autocollinearity remains by such methods: Aitken, transform the input data, Kochrena - Orkatta, Durbin. The feasibility and effectiveness of the use these methods. Using an econometric model to calculate the prediction of the dependent variable with autocorrelation residuals.

#### ***Theme 8. Methods of instrumental variables***

Causes of correlation appearance between explanatory variables and residues. Estimation of model parameters using instrumental variables. Determination instrumental variables using different operators values: Wald operator evaluation, features of evaluation by the method of Bartlett, operator evaluation Durbin. Measurement errors of variables.

#### ***Theme 9. Distributed lag models***

The concept of lag and lagged variables. Determination of the log coefficient. Building mutual correlation function and its graph. Building a distributed lag econometric models. Parameter estimation with lagged values of factors and indicators, correction and prediction.

### Structure of educational Discipline

| Names of Modules and Themes  | Quantity of Hours |       |           |          |         |         |            |          |           |          |         |         |            |  |
|--|-------------------|-------|-----------|----------|---------|---------|------------|----------|-----------|----------|---------|---------|------------|--|
|  | Full-time         |       |           |          |         |         |            | Distance |           |          |         |         |            |  |
|  | W                 | Total | including |          |         |         |            | Total    | including |          |         |         |            |  |
|  |                   |       | L         | Se<br>m. | Pr<br>. | La<br>b | Ind<br>.w. |          | L         | Se<br>m. | Pr<br>. | La<br>b | Ind<br>.w. |  |
| 1  | 2                 | 3     | 4         | 5        | 6       | 7       | 8          | 9        | 10        | 11       | 12      | 13      | 14         |  |
| <b>Module 1 <u>Methods of construction of general linear model</u></b>                           |                   |       |           |          |         |         |            |          |           |          |         |         |            |  |
| Theme 1. Subject, methods and objectives of discipline   | 1                 | 1     | 1         |          | -       | -       |            |          |           |          |         |         |            |  |
| Theme 2. Methods of the general linear model   | 2-3               | 3     | 1         |          | -       | -       | 4          |          |           |          |         |         |            |  |
| Theme 3. Multicollinearity and its impact on the estimation of the model parameters              | 4-5               | 10    | 2         | -        | 2       | -       | 6          |          |           |          |         |         |            |  |
| Theme 4. Generalized least squares   | 6                 | 7     | 1         | -        | 2       | -       | 4          |          |           |          |         |         |            |  |
| Theme 5. Econometric model of the dynamics   | 7                 | 7     | 1         |          | 2       |         | 4          |          |           |          |         |         |            |  |
| Total for module 1   |                   | 30    | 5         |          | 6       | -       | 18         |          |           |          |         |         |            |  |
| <b>Module 2 <u>Empirical methods of quantitative analysis based on statistical equations</u></b> |                   |       |           |          |         |         |            |          |           |          |         |         |            |  |
| Theme 6. Empirical methods of quantitative analysis based on statistical equations               | 8-9               | 8     | 2         | -        | 2       |         | 4          |          |           |          |         |         |            |  |
| Theme 7. Construction an econometric model with the autocollinearity remains                     | 10-11             | 8     | 2         | -        | 2       |         | 4          |          |           |          |         |         |            |  |
| Theme 8. Methods of instrumental variables   | 11-13             | 8     | 2         | -        | 2       |         | 4          |          |           |          |         |         |            |  |
| Theme 9. Distributed lag models  | 14-15             | 6     | 1         | -        | 1       |         | 4          |          |           |          |         |         |            |  |
| Total for module 2   |                   | 30    | 10        | -        | 4       |         | 6          |          |           |          |         |         |            |  |
| <b>Total sum</b>   |                   | 90    | 15        |          | 30      |         | 60         |          |           |          |         |         |            |  |

#### 4. Themes of seminars

| № | Name of Themes | Quantity of hours |
|---|----------------|-------------------|
| 1 |                |                   |
| 2 |                |                   |
|   |                |                   |

#### 5. Topics of practical classes

| №            | Name of Themes  | Quantity of hours |
|--------------|---|-------------------|
| 1            | General view of a linear econometric model, its structure and stages of construction. Specification. Prerequisites for using the method of least squares (OLS 1). Properties of estimates, their characteristics.   | 2                 |
| 2            | The concept of the main principles of the classical correlation econometric analysis. The concept of multicollinearity, methods and characteristics of its identification.  | 2                 |
| 3            | The concept of heteroscedasticity and methods of its study. The impact of heteroscedasticity on the properties of parameter estimates. Generalized least squares method (Aitken method) estimates of the parameters of the linear econometric models with heteroscedastic residues. | 2                 |
| 4            | Features of the econometric modelling based on time series. Trend model and methods to determine its parameters. The shape of the trend (linear, parabolic, hyperbolic, logical). Interpretation the parameters of the trend model. Graphic representation of the trend.            | 4                 |
| 5            | The advisability of the use in econometric calculations the statistical equations dependencies. The method of regression analysis and the method of statistical dependence equations. Comparison coefficients is the base of statistical equations dependencies.                    | 2                 |
| 6            | The concept of autocorrelation. The nature and consequences of autocorrelation in econometric models. Check for autocorrelation. Durbin-Watson criterion.   | 2                 |
| 7            | Causes of correlation appearance between explanatory variables and residues. Estimation of model parameters using instrumental variables.   | 2                 |
| 8            | The concept of lag and lagged variables. Determination of the log coefficient. Building mutual correlation function and its graph. Building a distributed lag econometric models.   | 4                 |
| <b>Total</b> |   | 30                |

#### 6. Topics of lab classes

| № | Name of Themes | Quantity of hours |
|---|----------------|-------------------|
| 1 |                | -                 |

## 7. Control questions, sets of tests to determine the level of knowledge acquisition by students

### *Questions for writing control work and verbal questioning*

1. **What the Econometrics is?** (is science which studies concrete quantitative conformities to the law and intercommunications of economic objects and processes by mathematical and statistical methods and models.)
2. **What the Economically-mathematical model is?** (is mathematical description of economic process or phenomenon with the purpose of its research and management. Among economically-mathematical models an important place is occupied by econometrical.)
3. **Which groups could be divided Econometrical methods?** (1) methods of evaluation of parameters of classic econometrical model using the method of the least squares (MLQ), their verification (checking of model for its accordance to that modeling process or object); 2) methods of evaluation of parameters of the generalized model, when some pre-conditions of the usage of method of MLQ are violated; 3) methods of evaluation of parameters of dynamic econometrical models, their verification; 4) methods of evaluation of parameters of econometrical models which are based on the basis of the system of simultaneous structural equalizations.)
4. **What is the main task of econometrical research?** (The main task of econometrical research is an evaluation of parameters and verification of meaningfulness of econometrical model which is carried out stage-by-stage)
5. **What stages of econometrical research you know?** (A specification of the model in a mathematical form. Estimation of model parameters. Checking of model for authenticity. Application of the developed models in prognostication)
6. **Describe the structure of Econometrics.** (econometrical methods; econometrical models of economic processes and phenomena)
7. **Tell us about elements of the mathematical model of object.** (description of the object which needs to be defined (unknown values) – vector  $Y=(y_j)$ ; descriptions of external (concerning the modeled object) conditions which are changing – vector  $X=(X_j)$ ; aggregate of object's internal parameters –  $A$ .)
8. **There are two groups of Mathematical models. What are they?** (structural; functional)
9. **To what models belong the Econometric model?** (functional models)
10. **Describe the main mandatory elements for the construction of econometric model.** (large enough aggregate of data observations; homogeneity of observations set; exactness of entrance information)
11. **The observation aggregate can be represented as a well-organized set (matrices) of data with the parameters  $n, m, T$ . What are they mean?** ( $n$  – number of aggregate units;  $m$  – number of signs which describe each unit;  $T$  – time interval during which the sign of certain supervision is studied)
12. **What are three methods of sample set forming ?**(temporal, when functioning of separate object is examined into the dynamics; - spatial, when the observation aggregate is studied in statics; - spatial-temporal, which is combination of spatial and temporal sample set)
13. **All errors are divided into two groups. What are they** (*systematic* and *random*)? **What is the difference between them** (The *systematic* errors have *permanent size*, *Random* errors are predetermined by influence of random factors during the indexes forming)?

**NATIONAL UNIVERSITY OF LIFE AND ENVIRONMENT SCIENCES OF UKRAINE**

|                   |  |   |   |
|-------------------|--|---|---|
| <u>"Bachelor"</u> | <u>Statistics and Economic Analysis department</u> | <b>Ticket number</b><br><b>1</b><br><br>the discipline<br><u>"Econometrics"</u> | <b>Approved</b><br>Chief of Department of<br>Statistics and Economic<br>Analysis<br><br>_____<br>(signature)<br><u>prof. I.D.Lazarysnyna</u><br>"____" 20 |
|-------------------|--|---|---|

**Examination task****I. Problem**

If the coefficient of determination is evened 0,64, the coefficient of correlation is evened:

**II. Theoretical question**

Evaluation of model parameters with autocorrelation residues

**III. Tests****1. Connection is substantial, if coefficient of correlation:**

- a. Greater 0,5
- b. Negative
- c. Positive

**2. Autocorrelation of tailings - is**

- a. The phenomenon is in econometrical research, when dispersion of rejections is different, and covariation of rejections is absent
- b. The phenomenon is in econometrical research, when dispersion of rejections is different, but observed covariation of rejections
- c. The phenomenon is in econometrical research, when dispersion of rejections permanent, and covariation of rejections is absent
- d. The phenomenon is in econometrical research, when dispersion of rejections is permanent, but observed covariation of rejections
- e. The phenomenon is in econometrical research, when dispersion of rejections is different, and here observed covariation of rejections

**3. If the determinant of correlation equals to 1, it mean that:**

- a. It is not possible to set
- b. there is complete multicollinearity
- c. multicollinearity is absent
- d. there is partial multicollinearity

**4. In the presence of autocorrelation of the remains of estimation of model parameters can have the following results:**

- a. Estimates of the model parameters will be shifted, statistical criteria can not be used in the dispersion analysis, the ineffectiveness of the estimates of the parameters of the econometric model leads to ineffective predictions
- b. Fade the accuracy of the estimation of parameters, the evaluation of the parameters become insignificant due to the presence of multicollinear explanatory variables, the estimation of parameters

become sensitive to the volume of units of observation

c. Estimates of model parameters will be shifted, statistical criteria can not be used in the dispersion analysis.

**5. Intercommunication of successive elements of sentinel or spatial data row is autocorrelation**

- Yes
- No

**6. Why is an accidental value introduced in an econometric model?**

- a. Because the investigated factors can not fully explain the change in the effective indicator
- b. To apply statistical research methods
- c. Because the random component has a quantitative dimension

**7. At presence of heteroscedasticity in an econometric model, to estimate parameters a least-squares method, it is enough:**

- a. To change the specification of model
- b. To convert information of entrances
- c. To take deviation from middle
- d. To standardize explanatory variables

**8. The presence of heteroscedasticity is testified if:**

- a. If  $R^* \neq F_{tabl}$
- b. If  $R^* < F_{tabl}$
- c. If  $R^* > F_{tabl}$
- d. If  $R^* = F_{tabl}$

**9. The sum of tailings in correctly built model is evened:**

- a. It is not possible to define
- b. 0
- c. To any value from 0 to
- d. 100%
- e. To any value from -1 to 1

**10. Criterion  $\chi^2$  - Pearson can take value**

- a. Any positive numerical value
- b. Any numerical value
- c. Any negative numerical value
- d. from -1 to +1
- e. from 0 to

**8. Methods of education**

| Practical               | Visual                        | Verbal                    | Working with book | Video- method      |
|-------------------------|-------------------------------|---------------------------|-------------------|--------------------|
| Experiments, exercises, | Illustrations, demonstration, | Explanation, explanation, | Reading           | Viewing, Training, |

|                              |                         |   |  |   |
|------------------------------|-------------------------|---|--|---|
| training and productive work | observation of students | narration, conversation, instruction, lecture, discussion, debate |  | Exercises under the supervision of "electronic teacher" control |
|------------------------------|-------------------------|---|--|---|

### 9. Control forms

Control measures include current and final evaluation of student knowledge. Current control is carried out during practice and in the process of self-study in the following areas: rapid surveys, tests, tasks "right-wrong" problem.

### 10. Distribution of points that students receive

| Current control |          |          |          | Rating of Academic Affairs<br>$R_{HP}$ | Rating of additional work<br>$R_{DP}$ | Fine rating<br>$R_{ШТР}$ | Final certification<br>(exam or test) | Total quantity of marks |
|-----------------|----------|----------|----------|--|---------------------------------------|--------------------------|---------------------------------------|-------------------------|
| Module 1        | Module 2 | Module 3 | Module 4 |  |                                       |                          |                                       |                         |
| 0-100           | 0-100    | 0-100    | 0-100    | 0-70                                   | 0-20                                  | 0-5                      | 0-30                                  | 0-100                   |

**Remark1.** According to the "Regulations on exams and credits in NULES of Ukraine", ranking students for Academic  $R_{HP}$  study concerning certain discipline is given by the formula

$$R_{HP} = \frac{0,7 \cdot (R_{3M}^{(1)} \cdot K_{3M}^{(1)} + \dots + R_{3M}^{(n)} \cdot K_{3M}^{(n)})}{K_{DIS}}$$

where  $R_{3M}^{(1)}, \dots, R_{3M}^{(n)}$  – ratings of content modules on a 100-point scale;  
n - number of structural modules;

$K_{3M}^{(1)}, \dots, K_{3M}^{(n)}$  – number of ECTS credits provided work curriculum for the corresponding semantic module;

$K_{DIS} = K_{3M}^{(1)} + \dots + K_{3M}^{(n)}$  – number of ECTS credits provided work curriculum for courses in the current semester;

The formula can be simplified if we take  $K_{3M}^{(1)} = \dots = K_{3M}^{(n)}$ . Then it will look like

$$R_{HP} = \frac{0,7 \cdot (R_{3M}^{(1)} + \dots + R_{3M}^{(n)})}{n}$$

## Grading scale

| Evaluation on the scale | Total points for all activities |
|-------------------------|---------------------------------|
| excellent               | 90 – 100                        |
| good                    | 74 – 89                         |
| satisfactorily          | 60-73                           |
| unsatisfactorily        | 0-59                            |

### 11. Methodological support

1. Regulations.
2. Complex teaching of the discipline.
3. Methodological guidelines for independent study courses.
4. Methodological guidelines for writing a term paper.
5. [Course: Econometrics](#)  ([nubip.edu.ua](http://nubip.edu.ua))

### 12. Recommended literature

#### Main

#### *Legislation and regulations*

1. [Закон України "Про державну статистику"](#) Закон введено в дію з дня прийняття (згідно з Постановою Верховної Ради України від 17 вересня 1992 року N 2615-XII) Із змінами і доповненнями, внесеними Законами України від 13 липня 2000 року N 1922-III (Законом України від 13 липня 2000 року N 1922-III цей Закон викладено в новій редакції), від 15 грудня 2005 року N 3205-IV, від 5 березня 2009 року N 1070-VI, від 1 червня 2010 року N 2289-VI (зміни, внесені Законом України від 1 червня 2010 року N 2289-VI, вводяться в дію з 31 липня 2010 року), від 2 грудня 2010 року N 2756-VI, від 13 січня 2011 року N 2938-VI
2. Наказ Державної служби статистики "Про затвердження форм державних статистичних спостережень у галузі сільського та рибного господарства" від 17.07.2012 р. №301
3. Наказ Державної служби статистики "Про затвердження Положення про Реєстр статистичних одиниць у сільському господарстві, мисливстві, лісовому і рибному господарстві – Реєстр АГРО" 02.07.2011 №278

#### *Tutorials*

- 4 . Наконечний С. І., Терещенко Т. О., Романюк Т. П. Економетрія: Підручник.-2-е вид. доп. та перероб. - К. : КНЕУ, 2010. - 296 с.
5. Економетрика [Текст] : підруч. для студ. вищ. навч. закл. / О. І. Черняк [та ін.] ; [за ред. О. І. Черняка] ; Київ. нац. ун-т ім. Т. Шевченка. - К. : ВПЦ "Київський університет", 2010. - 359 с.
6. Економетрія (економетрика) [Текст] : навч. посіб. [для студ. заоч. форми навч. всіх екон. спец. ВНЗ] / Єрмоменко В. О. [та ін.] ; Терноп. нац. екон. ун-т. - Т. : Підручники і посібники, 2012. - 115 с.
7. Ілюстративний матеріал з навчальної дисципліни "Економетрика" для студентів галузі знань 0305 "Економіка і підприємництво" всіх форм навчання [Текст] / Харк. нац. екон.

- ун-т ; [уклад.: Прокопович С. В., Степурина С. О., Чуйко І. М.]. - Х. : Вид. ХНЕУ, 2012. - 30 с.
8. Харламова Г. О. Прикладна економетрика : навч. посіб. для студ. екон. спец. освіт.-кваліфікац. рівня "магістр" / Г. О. Харламова, О. І. Черняк; Київ. нац. ун-т ім. Т. Шевченка, Екон. ф-т. - К. : Наук. світ, 2011. - 187 с.

### Supplementary

- 9 . Айвазян С.А., Иванова С.С. Эконометрика. Краткий курс: учеб. пособие / С.А. Айвазян, С.С. Иванова. – М.: Маркет ДС, 2017. – 104 с.
10. Бородич С.А. Вводный курс эконометрики: Учебное пособие. – Мн.: БГУ, 2010. – 354 с.
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### 13. Information Resources

1. Верховна Рада України <http://zakon.rada.gov.ua/>
2. Міністерство фінансів України <http://www.minfin.gov.ua>
3. Кабінет Міністрів України <http://www.kmu.gov.ua/control/>
4. Газета «Все про бухгалтерський облік» <http://www.vobu.com.ua>
5. Газета «Урядовий кур'єр» <http://www.ukurier.gov.ua/>
6. Журнал «Вісник податкової служби України» <http://www.visnuk.com.ua>
7. Міністерство фінансів України <http://www.minfin.gov.ua>
8. Нормативні акти України - законодавство для практиків <http://www.nau.kiev.ua>
9. Офіційний вісник України <http://www.gdo.kiev.ua>
10. Положення про екзамени та заліки в НУБіП України. Затверджене Вченою радою НУБіП України від 27 лютого 2019 р. <https://nubip.edu.ua/node/12654>