

Shikshan Prasarak Sanstha`s

Padmabhushan Vasatraodada Patil Mahavidyalaya, Kavathe Mahankal

DEPARTMENT OF GEOGRAPHY

Mechanism for framing Learning Outcomes and Measuring their Attainment

Step 1: Defining the Vision and Mission of the Department.

Vision-To achieve the excellence with academic advanced knowledge by dedicated teaching and promoting knowledge in the discipline of Geography”

Mission-"We are committed to advancing geographical knowledge and promoting sustainability through inter disciplinary collaboration, experiential learning ,and inclusive educational practices, preparing our students to address complex societal issues."

Step 2: Defining Program Outcomes (PO's) and Program Specific Outcomes (PSO's) of the program.

Program outcomes (PO's)

After completion of B.A. programme Students will be able to,

PO1: get information about the causes and effects of local, national and international problems like global warming, acid rain, ozone depletion, soil degradation, deforestation etc.

PO2: gains the knowledge of quantitative methods and their ability of statistical and cartographical methods to solve the geographical problems.

PO3: know the basic concepts and terminologies used in Geography like interior of the earth, plate tectonic, sea floor spreading, population growth, disasters, composition and structure of atmosphere, hydrosphere, etc.

PO4: understand the basic disciplines in Geography and its sub branches.

Program Specific Outcomes (PSO's)

After completion of graduation in B.A. (GEOGRAPHY) students will be able to,

PSO1: have got comprehensive knowledge in the discipline of Geography.

PSO2: apply geographical knowledge in their day to day life like being alert about disasters, weather and climatic change.

PSO3: acquire basic knowledge of surveying methods and map making technique.

PSO4: get information about various economic activities of man and their spatial temporal distribution.

Step 3: Defining Course Outcomes (CO's) of each course in a Program.

Course outcomes (CO's)

Course Outcomes

Course 1: - B. A. I DSE – 1 Physical Geography

At the end of this course students will be able to,

CO1.1: know the latest concepts in Physical Geography (continental drift, plate tectonic, cycle of erosion).

CO 1.2: understand the Atmosphere, Lithosphere, Fluvial Cycle, Hydrosphere and the work of denudation agents and their associated landforms and the interior structure of the earth.

Course 2: B. A. I DSE – 2 Human Geography

At the end of this course students will be able to,

CO 2.1: Student should know human races, population composition and different population theories.

CO 2.2: To Examine patterns of settlement and the agricultural types, problems and prospects.

Course 3: B.A. II DSE - 3 Soil Geography

At the end of this course students will be able to,

CO 3.1: soil processes, soil formation and soil properties.

CO 3.2: understand the classification, characteristics and distribution of soils.

Course 4: B.A. II DSE - 4 Resource Geography

At the end of this course students will be able to,

CO 4.1: understands the concept of resource and studies the classification, examine the major resources.

CO 4.2: knows the sustainable resource development.

Course 5: B.A. II Geography DSE - 5 OCEANOGRAPHY

At the end of this course students will be able to,

CO 5.1: The students familiarize with the basic and fundamental concepts of oceanography a branch of Physical Geography.

CO 5.2: With this study, students understand marine is key resource for the development of any country and to know physical and chemical properties of oceans.

Course 6: B.A. II Course – 6 Agricultural Geography

At the end of this course students will be able to,

CO 6.1: understand the role of agricultural determinants towards the changing cropping pattern.

CO 6.2: understand agricultural concepts and modern technologies used in agriculture, implementation of the Green Revolution in India.

Course 7: Evolution of Geographical Thought

At the end of this course students will be able to,

CO 7.1: Student should be able to understand in-depth about the evolution of thought.

CO 7.2: Understanding of recent trends in geography.

Course 8: Physical Geography of India

At the end of this course students will be able to,

CO 8.1: Understanding physical setup of the country

CO 8.2: Student will be able to understand climate of India

Course 9: POPULATION GEOGRAPHY

At the end of this course students will be able to,

CO 9.1: gets an understanding of distribution and trends of population growth in the developed and less developed countries, along with population theories.

CO 9.2: an understanding of the dynamics of population, the implications of population composition in different regions of the world, An appreciation of the contemporary issues in the field of population studies

Course 10: Economic Geography

At the end of this course students will be able to,

CO 10.1: Understand basic concept in economic geography and the relationship between human activities and resources.

CO 10.2: Understand the economic situation at global level and apply this knowledge at local level.

Course 11: Urban Geography

At the end of this course students will be able to,

CO 11.1: Understood the basic concepts in urban Geography

CO 11.2: Understand the impact of site and situation on settlements & types of urban and rural settlements.

Course 12: Political Geography

At the end of this course students will be able to,

CO 12.1: Understand how and why states are organized.

CO 12.2: Learn the relation between government and its people and the influence of political power on geographical space.

Course 13: Map work and Map Reading

At the end of this course students will be able to,

CO 13.1: Learn the importance of map making and map reading

CO 13.2: Understand the concept of scale and map projections.

Course 14: Advanced Techniques and Field work.

At the end of this course students will be able to,

CO 14.1: Be able to understand the importance of field work and use of advanced techniques (GIS & GPS) in Geography

CO 14.2: Learn how to analyse Geographical data with the help of computer.

Step 4: Defining relation between Course Outcomes (COs) and POs/PSOs for each course to obtain overall CO mapping with each POs/PSOs. (Course Articulation Matrix)

In this step, CO's of each course are mapped with PO's & PSO's. A correlation is established between CO's and PO's / PSO's in the scale of 0 to 3. 0 if there is no correlation between CO's and PO's / PSO's, 1 being low, 2 being median and 3 being high.

For example, suppose program XYZ (say) has 4 PO's & 4 PSO's. Then, course articulation matrix for a course – 1 (say) with two CO's is as follows.

CO's – PO's & PSO's mapping matrix (1-low, 2-medium, 3-high, 0-No correlation)

CO's	PO's / PSO's							
	PO1	PO2	PO3	PO4	PSO1	PSO2	PSO3	PSO4
CO 1.1	3	2	3	3	3	3	1	0
CO 1.2	3	1	3	1	3	2	0	2

In the same way we have course articulation matrices for all courses in that Program.

CO's – PO's & PSO's mapping matrix (1-low, 2-medium, 3-high, 0-No correlation)

CO's	PO's/PSO's							
	PO1	PO2	PO3	PO4	PSO1	PSO2	PSO3	PSO4
CO1.1	3	2	3	3	3	3	1	0
CO1.2	3	1	3	1	3	2	0	2
CO2.1	3	3	3	1	2	2	1	3
CO2.2	3	3	3	2	1	2	1	2
CO3.1	3	2	2	0	1	2	2	2
CO3.2	2	2	2	0	3	3	2	1
CO4.1	3	1	1	0	3	0	0	1
CO4.2	3	2	1	1	2	2	0	2
CO5.1	3	2	1	2	3	2	1	2
CO5.2	3	2	2	1	2	2	1	3
CO6.1	2	2	1	1	2	1	2	2
CO6.2	3	2	2	1	1	2	1	2
CO7.1	1	1	1	1	1	0	0	3
CO7.2	1	2	1	1	1	1	1	3
CO8.1	3	2	2	1	2	3	3	3
CO8.2	3	3	2	2	2	2	3	2
CO9.1	3	3	3	1	2	2	3	2
CO9.2	2	2	1	1	1	1	2	1
CO10.1	2	2	1	1	1	2	2	1
CO10.2	2	2	2	1	2	1	2	1
CO11.1	3	1	1	1	1	0	1	1
CO11.2	2	2	1	1	2	1	1	1
CO12.1	3	1	2	1	1	0	1	1
CO12.2	0	0	1	1	1	1	1	1
CO13.1	1	2	2	1	2	2	3	2
CO13.2	1	2	2	1	1	2	3	2
CO14.1	1	2	0	1	1	1	3	1
CO14.2	0	3	1	1	2	3	3	3

Step 5: Development of overall CO's-PO's mapping matrix for all courses (Program Articulation Matrix).

The CO levels corresponding to each PO/PSO in course articulation matrix are averaged to obtain overall level of relation of course with each PO & PSO. For example, the overall relation of course – 1 (say) are reported the following matrix.

CO's	PO's / PSO's							
	PO1	PO2	PO3	PO4	PSO1	PSO2	PSO3	PSO4
CO 1.1	3	2	3	3	3	3	1	0
CO 1.2	3	1	3	1	3	2	0	2
Average ($X_{1,..,i}$)	3	1.5	3	2	3	2.5	0.5	1

Similarly, the overall level of relation of all the courses in the program is established. These levels are reported in the matrix form and this matrix is called as the program articulation matrix. For example, if the program XYZ has 19 courses then the program articulation matrix will be as follows.

Program Articulation Matrix

ID	Course name	$X_{i,..,1}$	$X_{i,..,2}$	$X_{i,..,3}$	$X_{i,..,4}$	$X_{i,..,5}$	$X_{i,..,6}$	$X_{i,..,7}$	$X_{i,..,8}$
C_1	Course_1	3	1.5	3	2	3	2.5	0.5	1
C_2	Course_2	3	3	3	1.5	1.5	2	1	2.5
C_3	Course_3	2.5	2	2	0	2	2.5	2	1.5
C_4	Course_4	3	1.5	1	0.5	2.5	1	0	1.5
C_5	Course_5	3	2	1.5	1.5	2.5	2	1	2.5
C_6	Course_6	2.5	2	1.5	1	1.5	1.5	1.5	2
C_7	Course_7	1	1.5	1	1	1	0.5	0.5	3
C_8	Course_8	3	2.5	2	1.5	2	2.5	3	2.5
C_9	Course_9	2.5	2.5	2	1	1.5	1.5	2.5	1.5
C_{10}	Course_10	2	2	1.5	1	1.5	1.5	2	1
C_{11}	Course_11	2.5	1.5	1	1	1.5	0.5	1	1
C_{12}	Course_12	1.5	0.5	1.5	1	1	0.5	1	1
C_{13}	Course_13	1	2	2	1	1.5	2	3	2
C_{14}	Course_14	0.5	2.5	0.5	1	1.5	2	3	2

Step 6: Methodology for measuring of Course Outcomes (CO's), Programme Specific Outcomes (PSO's) and Programme Outcomes (PO's) and setting up the target level.

In this step, methodology for measuring the attainment level of learning outcomes is defined and the target levels for the batch are defined.

➤ **Methodology for the attainment of learning outcomes for this year:**

Details of a program:

- Name of the Program: XYZ
- Program has n_1 PO's, say, $PO_1, PO_2, \dots, PO_{n_1}$
- Program has n_2 PSO's, say, $PSO_1, PSO_2, \dots, PSO_{n_2}$

Let $n = n_1 + n_2$, total number of PO's and PSO's.

- For convenience, let us denote the PO's & PSO's $PO_1, PO_2, \dots, PO_{n_1}, PSO_1, PSO_2, \dots, PSO_{n_2}$ by P_1, P_2, \dots, P_n
- Program has m courses, say, C_1, C_2, \dots, C_m
- Each course C_i has k course outcomes (CO's) denoted as $CO_{i,1}, CO_{i,2}, \dots, CO_{i,k}$, $i = 1, 2, \dots, m$. and k represents the number of outcomes particularly that of course.

Course articulation matrices and program articulation matrix are obtained as discussed in previous steps. Let $X_{i,j,l}$ be the level of correlation of $CO_{i,j}$ with P_l where, $i = 1, 2, \dots, m$, $j = 1, 2, \dots, k$, $l = 1, 2, \dots, n$. Then, the overall CO levels with PO's & PSO's of course C_i is computed as

$$X_{i,l} = \frac{1}{k} \sum_{j=1}^k X_{ijl} \text{ Here } k \text{ be the number of outcome in the average course taken.}$$

➤ Attainment of COs:

The CO attainment levels are measured based on the results of the internal assessment and external examination conducted by the university. The CO attainment level based on internal assessment and external assessment are computed separately.

Attainment levels based on internal/external assessment method are defined as follows:

- Level 1:** Average of student marks belongs to the class 0% - 20% for that assessment method
- Level 2:** Average of student marks belongs to the class 20% - 40% for that assessment method
- Level 3:** Average of student marks belongs to the class 40% - 60% for that assessment method
- Level 4:** Average of student marks belongs to the class 60% - 80% for that assessment method
- Level 5:** Average of student marks belongs to the class 80%-100% for that assessment method

Let ALC_E and ALC_I be the CO attainment level of the course based on external assessment and internal assessment respectively. The overall CO attainment of the course is calculated by taking 80% weightage to external assessment and 20% weightage to internal assessment.

$$ALC = 0.2 * ALC_I + 0.8 * ALC_E.$$

Let $ALC_1, ALC_2, \dots, ALC_m$ be the attainment levels of the courses C_1, C_2, \dots, C_m respectively.

The overall course attainment levels are categorized as below,

- Level 1: Poor – if $0 < ALC_i \leq 1$,
- Level 2: Average – if $1 < ALC_i \leq 2$,
- Level 3: Good – if $2 < ALC_i \leq 3$,
- Level 4: Very Good – if $3 < ALC_i \leq 4$,

Level 5: Excellent – if $4 < ALC_i \leq 5$.

For every course, we have set Very Good – Attained as target level that is we are aiming minimum level 4 (very good) and how the course status is attained in the performance of abilities of students.

At the end we will have attainment levels of all the courses,

ID	Course name	ALC_i	Level	Status
C_1	Course_1	4	Very Good	Attained
C_2	Course_2	3	Good	Not Attained
C_3	Course_3	3	Good	Not Attained
C_4	Course_4	3	Good	Not Attained
C_5	Course_5	3	Good	Not Attained
C_6	Course_6	3	Good	Not Attained
C_7	Course_7	4	Very Good	Attained
C_8	Course_8	4	Very Good	Attained
C_9	Course_9	4	Very Good	Attained
C_{10}	Course_10	4	Very Good	Attained
C_{11}	Course_11	4	Very Good	Attained
C_{12}	Course_12	4	Very Good	Attained
C_{13}	Course_13	4	Very Good	Attained
C_{14}	Course_14	4	Very Good	Attained

Step 7: Calculation of attainment levels of PO's and PSO's.

➤ **Attainment of PO's & PSO's:**

The attainment of PO's & PSO's are calculated using direct method. In direct method the attainment of PO's & PSO's are calculated through the attainment levels of courses. The course attainment values (ALC_i , $i = 1, 2, 3, \dots, m$) and the overall level of relation of course with each PO and PSO ($X_{i, l}$, $i = 1, 2, 3, \dots, m$, $l = 1, 2, 3, \dots, n$) are used to compute direct attainment level of each PO and PSO.

Direct Assessment: Direct attainment level of the l^{th} , PO's & PSO's is calculated as follows.

$$DALP_l = \frac{1}{\sum_{i=1}^m ALC_i} \sum_{i=1}^m x_{i,l}, * ALC_i, l=1,2,\dots,n.$$

ID	Course name	ALCi	X _{i, ..,1}	ALCi* X _{i, ..,1}	
C ₁	Course_1	4	3	12	
C ₂	Course_2	3	3	9	
C ₃	Course_3	3	2.5	7.5	
C ₄	Course_4	3	3	9	
C ₅	Course_5	3	3	9	
C ₆	Course_6	3	2.5	7.5	
C ₇	Course_7	4	1	4	
C ₈	Course_8	4	3	12	
C ₉	Course_9	4	2.5	10	
C ₁₀	Course_10	4	2	8	
C ₁₁	Course_11	4	2.5	10	
C ₁₂	Course_12	4	1.5	6	
C ₁₃	Course_13	4	1	4	
C ₁₄	Course_14	4	0.5	2	
Sum		51		110	
				$DALP_l = 110/51$	2.1569

Similarly, we have to find attainment levels of all PO's and PSO's.

Sr. No.	ALCi	X _{i, ..,1}	X _{i, ..,2}	X _{i, ..,3}	X _{i, ..,4}	X _{i, ..,5}	X _{i, ..,6}	X _{i, ..,7}	X _{i, ..,8}
1	4	3	1.5	3	2	3	2.5	0.5	1
2	3	3	3	3	1.5	1.5	2	1	2.5
3	3	2.5	2	2	0	2	2.5	2	1.5
4	3	3	1.5	1	0.5	2.5	1	0	1.5
5	3	3	2	1.5	1.5	2.5	2	1	2.5
6	3	2.5	2	1.5	1	1.5	1.5	1.5	2
7	4	1	1.5	1	1	1	0.5	0.5	3
8	4	3	2.5	2	1.5	2	2.5	3	2.5
9	4	2.5	2.5	2	1	1.5	1.5	2.5	1.5
10	4	2	2	1.5	1	1.5	1.5	2	1
11	4	2.5	1.5	1	1	1.5	0.5	1	1
12	4	1.5	0.5	1.5	1	1	0.5	1	1
13	4	1	2	2	1	1.5	2	3	2
14	4	0.5	2.5	0.5	1	1.5	2	3	2
Sum	51	31	27	23.5	15	24.5	22.5	22	25

Sr. No.	ALC _i * X _{i,.,1}	ALC _i * X _{i,.,2}	ALC _i * X _{i,.,3}	ALC _i * X _{i,.,4}	ALC _i * X _{i,.,5}	ALC _i * X _{i,.,6}	ALC _i * X _{i,.,7}	ALC _i * X _{i,.,8}
1	12	6	12	8	12	10	2	4
2	9	9	9	4.5	4.5	6	3	7.5
3	7.5	6	6	0	6	7.5	6	4.5
4	9	4.5	3	1.5	7.5	3	0	4.5
5	9	6	4.5	4.5	7.5	6	3	7.5
6	7.5	6	4.5	3	4.5	4.5	4.5	6
7	4	6	4	4	4	2	2	12
8	12	10	8	6	8	10	12	10
9	10	10	8	4	6	6	10	6
10	8	8	6	4	6	6	8	4
11	10	6	4	4	6	2	4	4
12	6	2	6	4	4	2	4	4
13	4	8	8	4	6	8	12	8
14	2	10	2	4	6	8	12	8
Sum	110	97.5	85	55.5	88	81	82.5	90
<i>DALP_i</i>	2.1569	1.9118	1.6667	1.0882	1.7255	1.5882	1.6176	1.7647

Step 8: Comparison of target level with obtained PO attainment.

In this step the target level of PO's and PSO's attainment are compared with obtained *DALP_i*

Attainment levels are defined as stated below.

Level 1: Poor – if $0 < ALC_i \leq 1$,

Level 2: Average – if $1 < ALC_i \leq 1.5$,

Level 3: Good – if $1.5 < ALC_i \leq 2$,

Level 4: Very Good – if $2 < ALC_i \leq 2.5$,

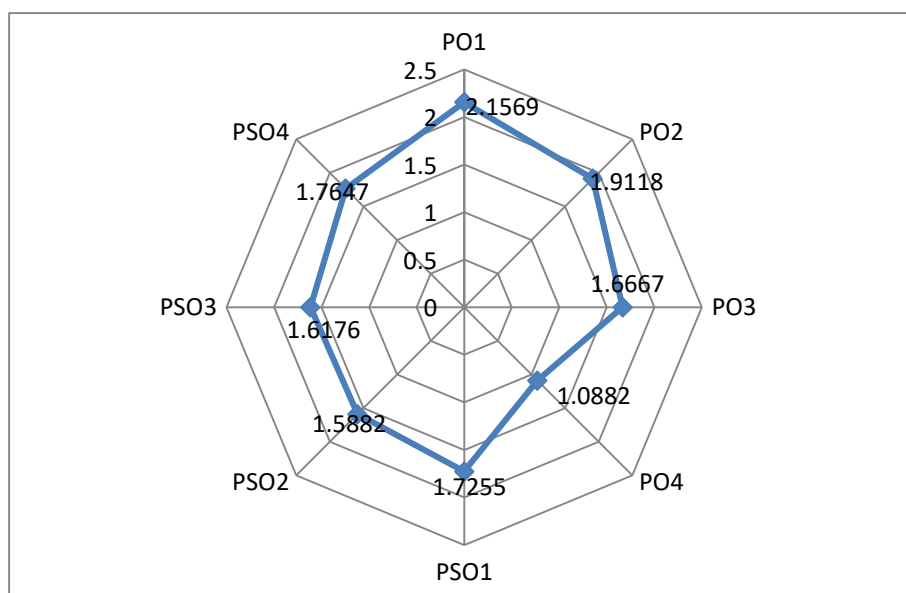
Level 5: Excellent – if $2.5 < ALC_i \leq 3$.

For every PO's and PSO's, we have set level 3 as target level that is we are aiming minimum level 3 (good) in the performance of abilities of students.

Attainment level of all the POs and PSOs

PO's	<i>DALP_i</i>	Level	Status
PO1	2.1569	Very Good	Attained
PO2	1.9118	Good	Attained
PO3	1.6667	Good	Attained
PO4	1.0882	Average	Not Attained
PSO1	1.7255	Good	Attained
PSO2	1.5882	Good	Attained
PSO3	1.6176	Good	Attained
PSO4	1.7647	Good	Attained

P_i attainment target level say, 3, indicates that, the department is aiming minimum level-3(good) in the performance of abilities of students.



Step 9: Planned actions:

Remedial Actions:

Planned actions for course attainment: Courses having course level less than level-4 are addressed by designing the different remedial measures like assignment/tutorials/remedial teaching.

Planned actions for program outcome attainment: PO's and PSO's with level attainment less than level-3 are addressed by planning remedial measures for the corresponding courses with respect to P_i .