

VIT 2521 - Information Theory and its applications

ASSIGNMENT - 1.

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class: IT-'A'
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Bins: 0-20, 21-40, 41-60, 61-80 & 81-100

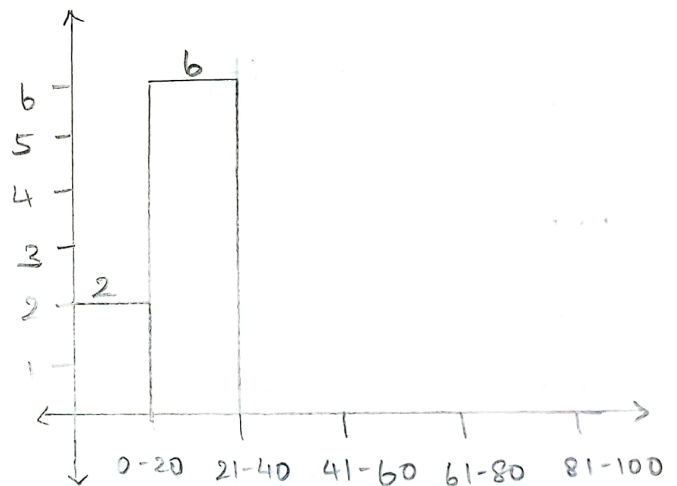
Note:

Here, I'm using Final credits earned in each subject based on the final Marksheet.

Solution:

Semester 1

Subject	credits
chemistry	30
English	27
Python	24
Maths	36
physics	24
python Lab	15
phy & chem lab	13.5
EC1	24

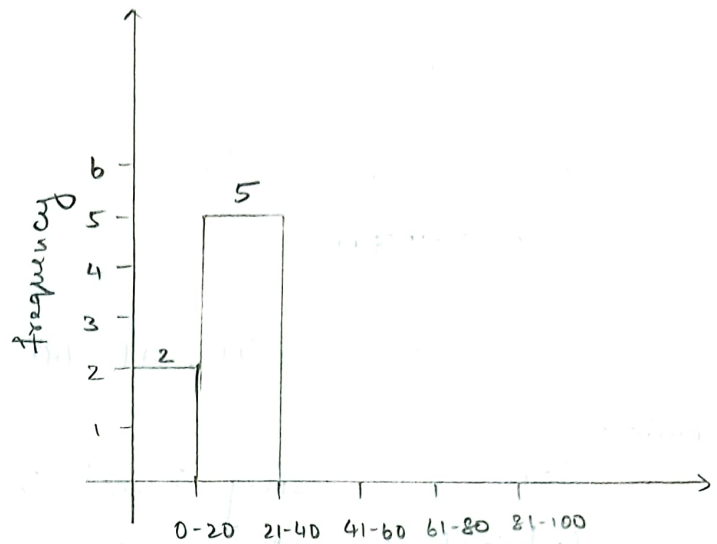


$$\text{Probability of each bin} = \frac{\text{No. of Subjects in each bin}}{\text{Total no. of Subjects}}$$

$$\begin{aligned} \text{Probability of each bin} &= [2/8, 6/8, 0, 0, 0] \\ &= [0.25, 0.75, 0, 0, 0] \end{aligned}$$

Semester 2

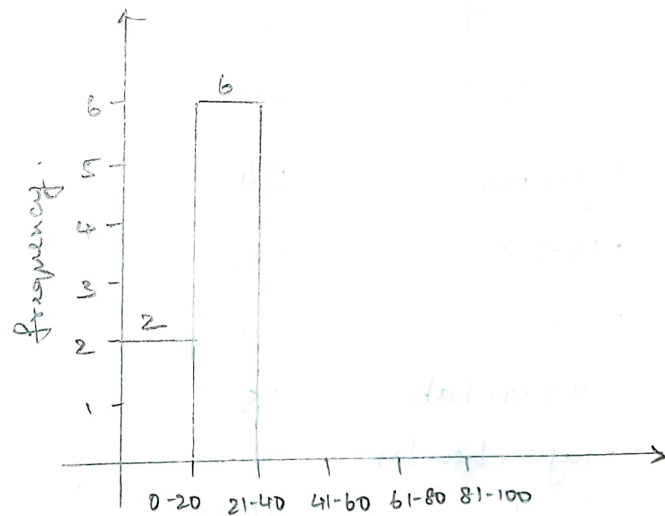
Subject	Credits
BEEE	24
LEC	24
EP Lab	15
Data Str	32
SDP Lab	15
Maths	40
Physics	24



$$\text{Probability} = [2/7, 5/7, 0, 0, 0] = [0.286, 0.714, 0, 0, 0]$$

Semester 3

Subject	Credits
UHV	24
PDP	30
Database	24
DLCO	30
IDC	27
DB Lab	15
PDP Lab	15
Maths	40



$$\text{Probability} = [2/8, 6/8, 0, 0, 0] = [0.25, 0.75, 0, 0, 0]$$

Calculating relative entropy between different semesters
Kullback-Leibler divergence.

$$R.E = \sum_{k=0}^{K=1} p(k) \log\left(\frac{p(k)}{q(k)}\right)$$

Relative entropy (1st || 2nd)

$$= 2/8 (\log 2/8 - \log 2/7) + 6/8 (\log 6/8 - \log 5/7) + 0$$

$$= \cancel{2/8} - 0.0485 + 0.0528$$

$$= 0.0043$$

Relative entropy (2nd || 3rd)

$$= 2/7 (\log 2/7 - \log 2/8) + 5/7 (\log 5/7 - \log 6/8) + 0$$

$$= 0.0550 - 0.0503$$

$$= 0.0047$$

Relative entropy (3rd || 1st)

$$= 2/8 (\log 2/8 - \log 2/8) + 6/8 (\log 6/8 - \log 6/8) + 0$$

$$= 0 + 0 + 0$$

$$= 0$$