# 20104016

# DEENA

## Importing Libraries

In [1]:
```
import numpy as np
import pandas as pd
import seaborn as sns
import matplotlib.pyplot as plt
```

## Importing Datasets

In [2]:
```
df=pd.read_csv("rainfall_tamil nadu.csv")
df
```

Out[2]:

| | index | SUBDIVISION | YEAR | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **0** | 3427 | TAMIL NADU | 1901 | 24.5 | 39.1 | 21.7 | 36.0 | 74.0 | 41.8 | 49.3 | 67.9 | 191.1 | 122.3 |
| **1** | 3428 | TAMIL NADU | 1902 | 67.2 | 9.8 | 25.1 | 21.9 | 84.7 | 39.3 | 55.1 | 113.8 | 98.6 | 282.2 |
| **2** | 3429 | TAMIL NADU | 1903 | 19.3 | 7.8 | 1.7 | 18.2 | 128.5 | 58.5 | 72.6 | 115.0 | 210.4 | 128.1 |
| **3** | 3430 | TAMIL NADU | 1904 | 35.2 | 0.1 | 0.7 | 19.5 | 121.9 | 34.9 | 89.0 | 40.4 | 85.7 | 163.2 |
| **4** | 3431 | TAMIL NADU | 1905 | 6.5 | 7.5 | 17.2 | 64.8 | 83.7 | 49.8 | 39.0 | 101.8 | 73.5 | 250.4 |
| **...** | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| **110** | 3537 | TAMIL NADU | 2011 | 4.3 | 11.2 | 8.0 | 91.5 | 33.4 | 56.0 | 45.5 | 128.9 | 76.0 | 200.4 |
| **111** | 3538 | TAMIL NADU | 2012 | 3.0 | 0.1 | 2.5 | 35.5 | 41.9 | 30.1 | 46.5 | 98.0 | 84.9 | 235.2 |
| **112** | 3539 | TAMIL NADU | 2013 | 3.9 | 30.9 | 30.0 | 20.3 | 42.0 | 54.6 | 42.7 | 110.7 | 113.5 | 127.9 |
| **113** | 3540 | TAMIL NADU | 2014 | 7.4 | 6.1 | 8.1 | 8.3 | 139.1 | 47.8 | 50.6 | 117.7 | 98.9 | 252.2 |
| **114** | 3541 | TAMIL NADU | 2015 | 8.3 | 2.3 | 21.7 | 108.8 | 112.4 | 62.4 | 43.5 | 81.6 | 98.4 | 132.6 |

115 rows × 20 columns

## Data Cleaning and Data Preprocessing

In [3]:
```
df=df.dropna()
```

In [4]:
```
df.columns
```

Out[4]:
```
Index(['index', 'SUBDIVISION', 'YEAR', 'JAN', 'FEB', 'MAR', 'APR', 'MAY',
       'JUN', 'JUL', 'AUG', 'SEP', 'OCT', 'NOV', 'DEC', 'ANNUAL', 'Jan-Feb',
       'Mar-May', 'Jun-Sep', 'Oct-Dec'],
      dtype='object')
```

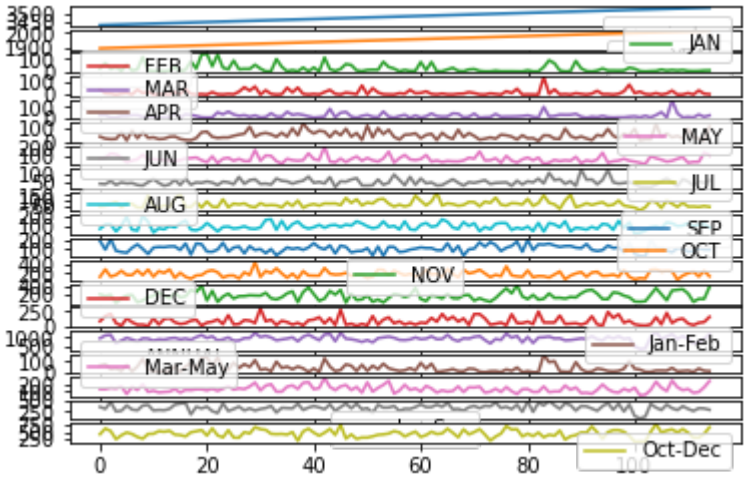
In [5]:
```
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
Int64Index: 115 entries, 0 to 114
Data columns (total 20 columns):
 #   Column       Non-Null Count  Dtype  
---  ------       --------------  -----  
 0   index        115 non-null    int64  
 1   SUBDIVISION  115 non-null    object 
 2   YEAR         115 non-null    int64  
 3   JAN          115 non-null    float64
 4   FEB          115 non-null    float64
 5   MAR          115 non-null    float64
 6   APR          115 non-null    float64
 7   MAY          115 non-null    float64
 8   JUN          115 non-null    float64
 9   JUL          115 non-null    float64
 10  AUG          115 non-null    float64
 11  SEP          115 non-null    float64
 12  OCT          115 non-null    float64
 13  NOV          115 non-null    float64
 14  DEC          115 non-null    float64
 15  ANNUAL       115 non-null    float64
 16  Jan-Feb      115 non-null    float64
 17  Mar-May      115 non-null    float64
 18  Jun-Sep      115 non-null    float64
 19  Oct-Dec      115 non-null    float64
dtypes: float64(17), int64(2), object(1)
memory usage: 18.9+ KB
```

# Line chart

In [6]:
```
df.plot.line(subplots=True)
```

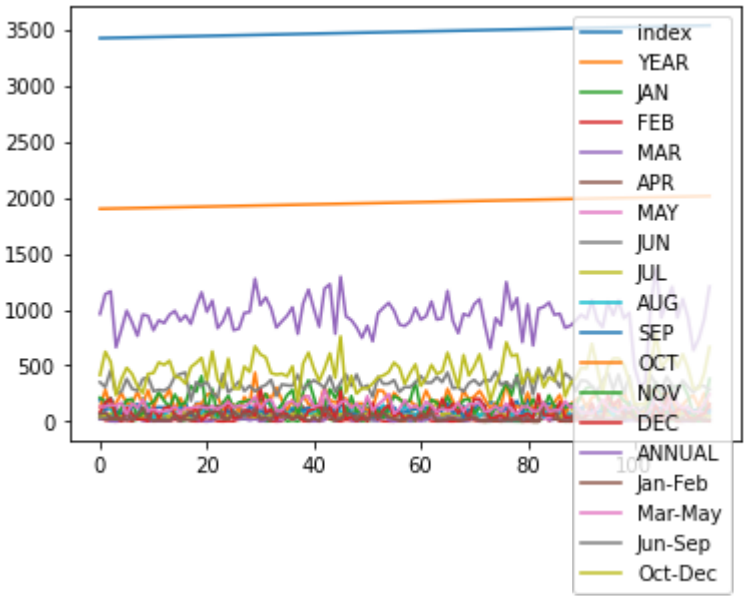
Out[6]:
```
array([<AxesSubplot:>, <AxesSubplot:>, <AxesSubplot:>, <AxesSubplot:>,
       <AxesSubplot:>, <AxesSubplot:>, <AxesSubplot:>, <AxesSubplot:>,
       <AxesSubplot:>, <AxesSubplot:>, <AxesSubplot:>, <AxesSubplot:>,
       <AxesSubplot:>, <AxesSubplot:>, <AxesSubplot:>], dtype=object)
```




# Line chart

In [7]:
```
df.plot.line()
```

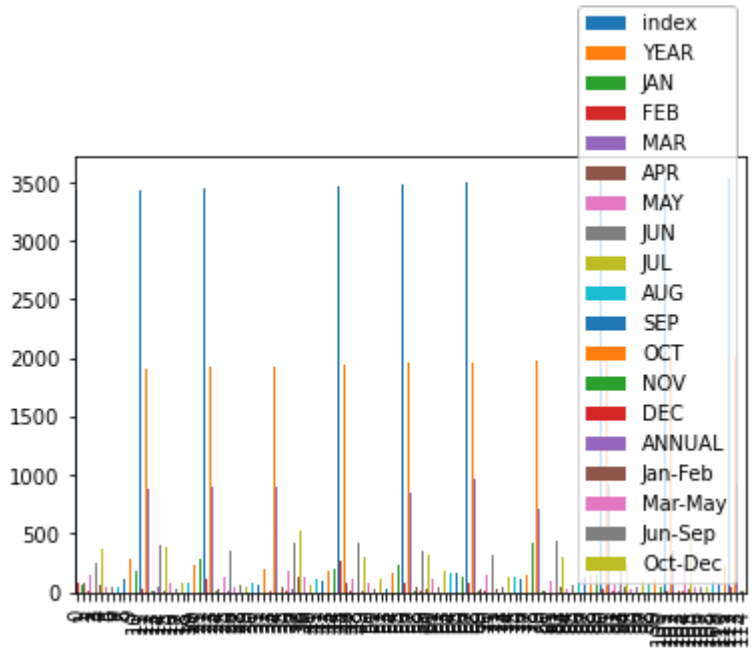
Out[7]:
```
<AxesSubplot:>
```




# Bar chart

In [8]:
```
df.plot.bar()
```

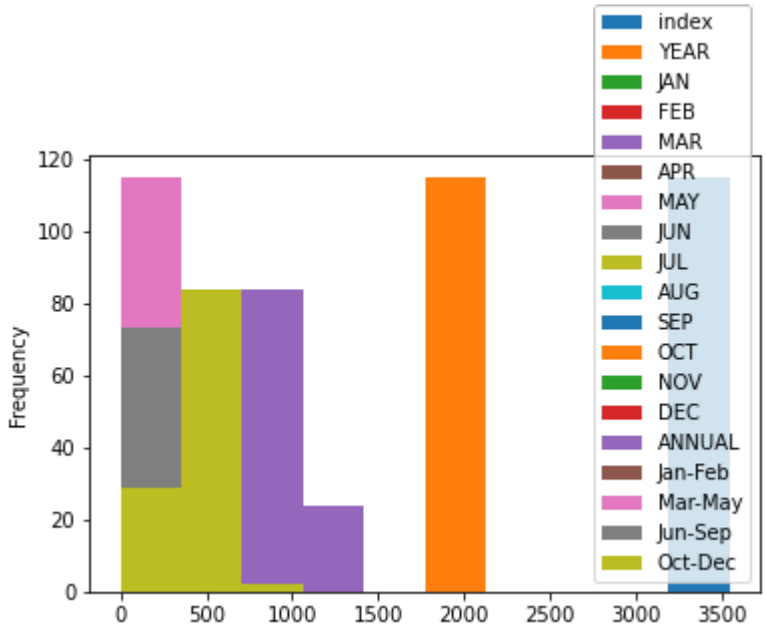
Out[8]: <AxesSubplot:>




# Histogram

In [9]:
```
df.plot.hist()
```

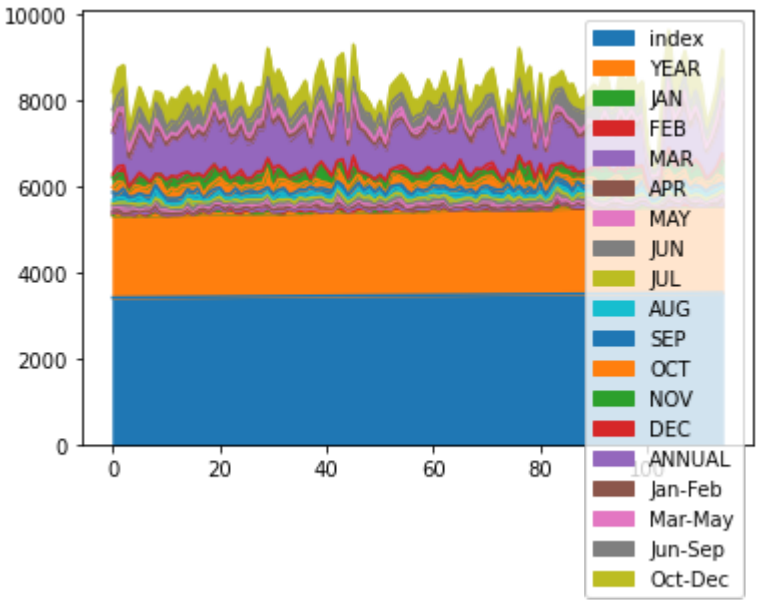
Out[9]: <AxesSubplot:ylabel='Frequency'>




# Area chart

In [10]:
```
df.plot.area()
```

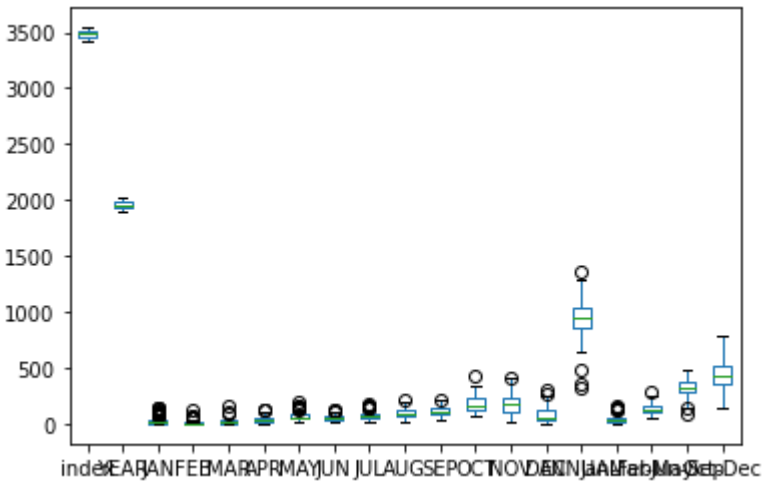
Out[10]: <AxesSubplot:>




# Box chart

In [11]:
```
df.plot.box()
```

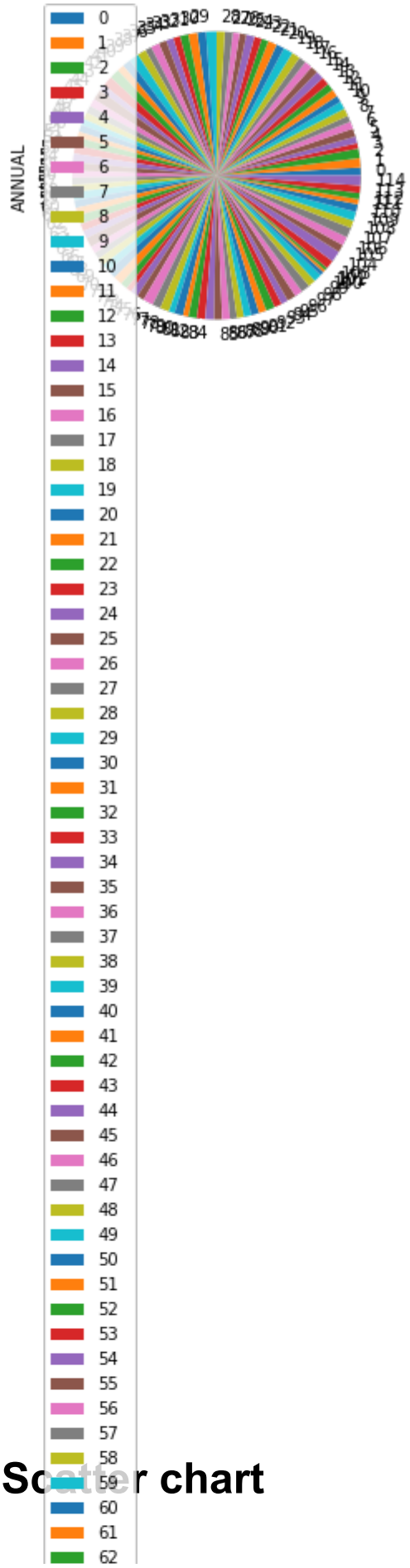
Out[11]: <AxesSubplot:>




# Pie chart

In [12]:
```
df.plot.pie(y='ANNUAL')
```

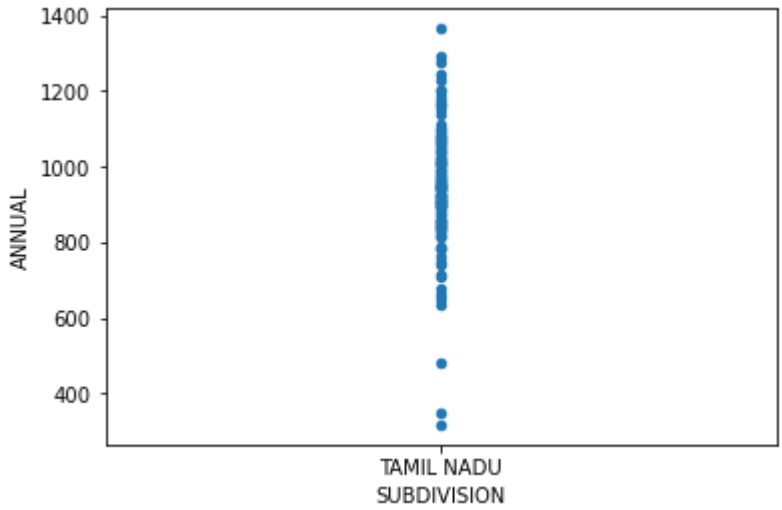
Out[12]:
```
<AxesSubplot:ylabel='ANNUAL'>
```




## Scatter chart

In [13]:
```
df.plot.scatter(x='SUBDIVISION', y='ANNUAL')
```

Out[13]: <AxesSubplot:xlabel='SUBDIVISION', ylabel='ANNUAL'>




In [14]:
```
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
Int64Index: 115 entries, 0 to 114
Data columns (total 20 columns):
 #   Column       Non-Null Count  Dtype
---  ------       --------------  -----
 0   index        115 non-null    int64
 1   SUBDIVISION  115 non-null    object
 2   YEAR         115 non-null    int64
 3   JAN          115 non-null    float64
 4   FEB          115 non-null    float64
 5   MAR          115 non-null    float64
 6   APR          115 non-null    float64
 7   MAY          115 non-null    float64
 8   JUN          115 non-null    float64
 9   JUL          115 non-null    float64
 10  AUG          115 non-null    float64
 11  SEP          115 non-null    float64
 12  OCT          115 non-null    float64
 13  NOV          115 non-null    float64
 14  DEC          115 non-null    float64
```

In [15]:
```
df.describe()
```

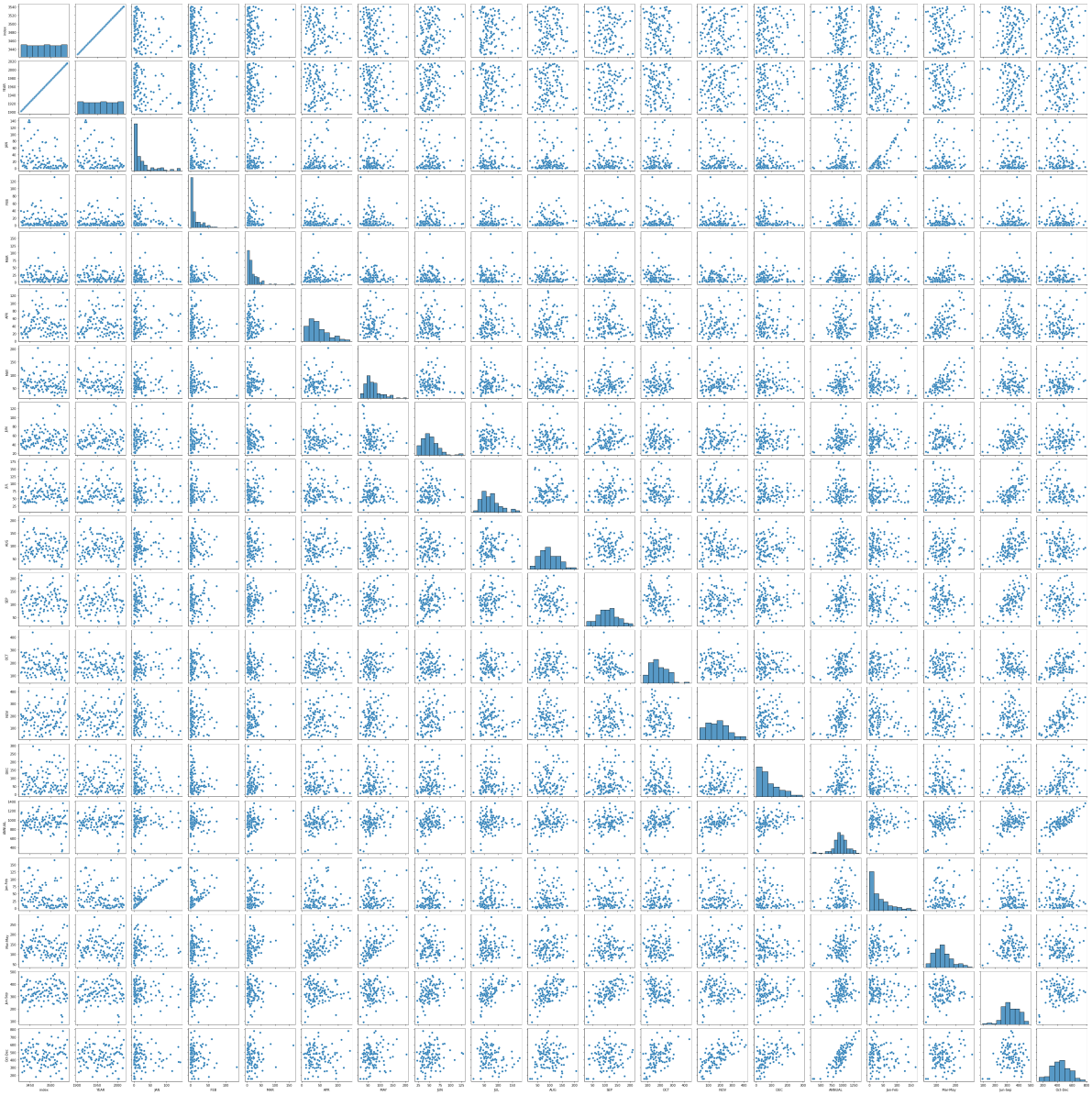
Out[15]:

| | index | YEAR | JAN | FEB | MAR | APR | MAY | |
|---|---|---|---|---|---|---|---|---|
| **count** | 115.000000 | 115.000000 | 115.000000 | 115.000000 | 115.000000 | 115.000000 | 115.000000 | 1 |
| **mean** | 3484.000000 | 1958.000000 | 23.819130 | 13.422609 | 19.475652 | 44.995652 | 69.920870 | |
| **std** | 33.341666 | 33.341666 | 32.253728 | 19.501219 | 22.389999 | 27.920223 | 31.775268 | |
| **min** | 3427.000000 | 1901.000000 | 0.100000 | 0.000000 | 0.000000 | 5.500000 | 19.800000 | |
| **25%** | 3455.500000 | 1929.500000 | 2.950000 | 1.200000 | 5.150000 | 23.650000 | 50.050000 | |
| **50%** | 3484.000000 | 1958.000000 | 10.000000 | 5.500000 | 11.900000 | 37.000000 | 61.100000 | |
| **75%** | 3512.500000 | 1986.500000 | 29.300000 | 18.050000 | 26.700000 | 59.300000 | 82.400000 | |
| **max** | 3541.000000 | 2015.000000 | 141.200000 | 131.300000 | 164.700000 | 132.100000 | 204.400000 | 1 |

# EDA AND VISUALIZATION

In [16]:
```
sns.pairplot(df)
```

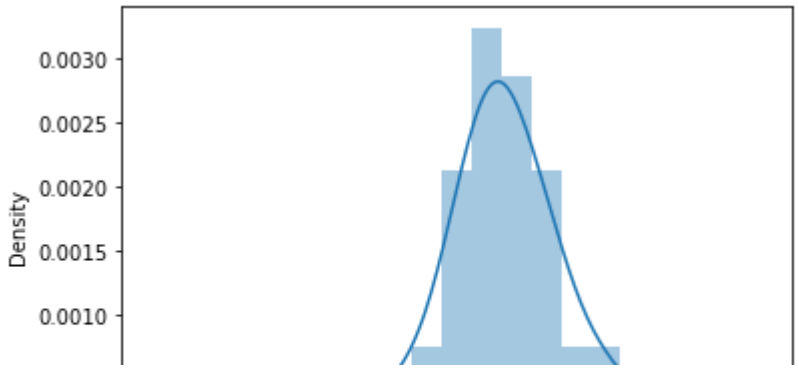
Out[16]: <seaborn.axisgrid.PairGrid at 0x1f357529fd0>



In [17]:
```
sns.distplot(df['ANNUAL'])
```

```
C:\ProgramData\Anaconda3\lib\site-packages\seaborn\distributions.py:2557: Fut
ureWarning: `distplot` is a deprecated function and will be removed in a futu
re version. Please adapt your code to use either `displot` (a figure-level fu
nction with similar flexibility) or `histplot` (an axes-level function for hi
stograms).
  warnings.warn(msg, FutureWarning)
```

Out[17]: <AxesSubplot:xlabel='ANNUAL', ylabel='Density'>




In [18]:
```
sns.heatmap(df.corr())
```

Out[18]: <AxesSubplot:>